88-60

No. 87-

IN THE

Supreme Court of the United States

OCTOBER TERM, 1988

OHIO POWER COMPANY AND ORMET CORPORATION,
Petitioners,

v.

LEE M. THOMAS, *et al.*,
Respondents.

APPENDIX TO PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

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UNITED STATES COURT OF APPEALS
DISTRICT OF COLUMBIA CIRCUIT

Nos. 85-1488 and 86-1331

NATURAL RESOURCES DEFENSE COUNCIL, INC., *et al.*,
Petitioners,

v.

LEE M. THOMAS, Administrator,
United States Environmental Protection Agency,
Respondent,

ALABAMA POWER COMPANY, *et al.*, AMERICAN PAPER INSTITUTE and the NATIONAL FOREST PRODUCTS ASSOCIATION, NATIONAL COAL ASSOCIATION, KENNECOTT, NATURAL RESOURCES DEFENSE COUNCIL, INC., and SIERRA CLUB, STATE OF OHIO,
Intervenors.

OHIO POWER COMPANY,
Petitioner,

v.

LEE M. THOMAS, Administrator,
United States Environmental Protection Agency, *et al.*,
Respondents,

NATURAL RESOURCES DEFENSE COUNCIL, INC., and
SIERRA CLUB,
Intervenors.

Argued Sept. 25, 1987

Decided Jan. 22, 1988

Petition for Review of an Order of the
U.S. Environmental Protection Agency

David G. Hawkins, with whom Richard E. Ayers and Howard I. Fox, Washington, D.C., for the Natural Resources Defense Council, Inc., et al., James M. Shannon, Atty. Gen. and Janet G. McCabe, Asst. Atty. Gen., the Commonwealth of Massachusetts, Boston, Mass., James E. Tierney, Atty. Gen. for the State of Maine, Augusta Me., and Robert Abrams, Atty. Gen. for the State of New York, Albany, N.Y., were on the brief for petitioners.

Robert Whitehead and Kenneth N. Tedford, Asst. Atty. Gen., State of Conn., Hartford, Conn., and Greg Sample, Asst. Atty. Gen., State of Maine, Augusta, Me., also entered an appearance for Natural Resources Defense Council, Inc., et al.

Henry V. Nickel, with whom F. William Brownell and Mel S. Schulze, Washington, D.C., for Alabama Power Co., et al., Donald C. Winson and Richard S. Wiedman, Pittsburgh, Pa., for Ormet Corp.; Robert F. Stauffer, Washington, D.C. and David C. Branand, Cleveland, Ohio for National Coal Ass'n, and Michael H. Holland and Earl R. Pfeffer, Washington, D.C., for United Mine Workers of America were on the joint brief for petitioners Alabama Power Co., et al. John W. Ublinger, Jr., also entered an appearance for petitioner Ormet Corp.

Lawrence A. Demase, Pittsburgh, Pa., and J. Daniel Hull, Washington, D.C., were on the brief for petitioners Monongahela Power Co. and Potomac Edison Co.

Ann G. Daniels, San Francisco, Cal., entered an appearance for petitioner Environmental Defense Fund, Inc.

Paul H. Schneider, Asst. Atty. Gen., State of New Jersey, Trenton, entered an appearance for petitioner, State of New Jersey.

Charles Carter, Asst. Gen. Counsel, EPA and Lisa F. Ryan, Atty., U.S. Dept. of Justice, with whom Scott Slaughter, Atty., Dept. of Justice, Alan Eckert, Associate General Counsel, EPA and Patricia Embrey, Atty., EPA, Washington, D.C., were on the brief for respondents. Michael W. Steinberg, Atty., U.S. Dept. of Justice and Gaylene Vasaturo, Atty., EPA, Washington, D.C., also entered an appearance for respondents.

Alfred V.J. Prather and Kurt E. Blase, Washington, D.C., were on the brief for intervenor Kennecott.

Dale T. Vitale, Asst. Atty. Gen., Columbus, Ohio for the State of Ohio, was on the brief for intervenor-respondent the State of Ohio.

Henry V. Nickel, W. William Brownell and Mel S. Schulze, Washington, D.C. for Alabama Power Co., et al., Michael K. Glenn, Washington, D.C., for American Paper Institute, et al., and David C. Branand, Washington, D.C., for National Coal Ass'n., were on the brief for intervenors Alabama Power Co., et al. Richard S. Wasserstrom, Washington, D.C., also entered an appearance for American Paper Institute, et al. Robert F. Stauffer, Washington, D.C., also entered an appearance for National Coal Ass'n.

Edwin Lloyd Pittman, Atty. Gen. State of Mississippi and Robert Franklin Spencer, Asst. Atty. Gen., State of Mississippi, Jackson, Miss., were on the brief for amici curiae the State of Mississippi, et al. urging affirmance.

Before RUTH B. GINSBURG and WILLIAMS, Circuit Judges, and AUBREY E. ROBINSON, Jr., Chief Judge, U.S. District Court for the District of Columbia.*

Opinion for the Court filed by Circuit Judge WILLIAMS.

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* Sitting by designation pursuant to 28 U.S.C. § 292(a).

WILLIAMS, Circuit Judge:

Under the Clean Air Act as amended in 1970, 42 U.S.C. §§ 7401 *et seq.* (1982), the Environmental Protection Agency sets national ambient air quality standards ("NAAQS") for various pollutants. *Id.* § 7409. Once they are set, each state must adopt and submit to the EPA a state implementation plan ("SIP") providing for achievement of the standards in each air quality control region. *Id.* § 7410(a)(1).[1] Such plans obviously must distribute the necessary pollution cutbacks among the various pollution sources. From 1970 to this day a dispute has raged over the extent to which pollution sources may make their required contribution toward these localized clean air goals by dispersing pollution rather than by reducing their emissions.

Dispersion may be either through space or time. A source may disperse its pollution through space by such devices as "tall stacks," which carry the pollutants away from the region and from the ground levels at which satisfaction of the NAAQS is measured. It may disperse pollution over time by intermittent controls systems ("ICS"), which vary the time of discharges so as to take advantage of changes in weather conditions.

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[1] Under 42 U.S.C. § 7407, the country is subdivided into interstate as well as intra-state regions. As of 1981 there were 236 such regions. B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 65 (1981).

Dispersion techniques vary from emission reductions in two fundamental ways. They are, at least up to a point, considerably cheaper than emissions reductions. This makes them attractive to industry and often to the states of origin. (The attraction may be particularly great where the state of origin produces high-sulphur coal.) On the other hand, reliance on such techniques increases the aggregate amounts of pollution dumped into the atmosphere. This makes them unattractive to environmentalists and to the citizens of downwind states,[2] to which the pollution will be swept and where acid rain may result.

First the courts and then Congress intervened to prevent states from allowing pollution sources to satisfy their obligations by means of dispersion. As a result, reductions in local ground-level pollution do not "count" toward satisfaction of the NAAQS to the extent that they rely on those dispersion techniques that are disapproved.

While these limitations obviously relate to important goals, the system has a certain eccentricity. The ambient air quality standards are ones to be fulfilled in more than 236 specific *local* areas. The anxiety over dispersion stems primarily from dispersion's impact outside the region of origin. But the means of allaying that anxiety is to disregard, for purposes of measuring contribution to local clean air, conduct which indisputably helps clean local air. Yet none of the constraints on dispersion, whether devised by courts, EPA or Congress, has forged

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[2] Of course individuals may also benefit from restrictions on dispersion as residents of the states where the stacks exist, for (as will appear) denial of credit for pollution control through dispersion will result in local sources reducing their pollution by *more than* the amount required for achievement of the NAAQS. However, as the NAAQS are set at levels found by EPA as "requisite to protect" the public health and welfare, 42 U.S.C. § 7409(b), many local residents may feel that the decrease in pollution is not worth the increment in electricity costs.

an operating link between those constraints and the injuries inflicted by dispersion. Thus, although the parties adduce some figures as to changes over time in total atmospheric "loadings" of sulphur dioxide, these are not related to any statutory goal or to any scheme for attaining specific cutbacks. This incongruity may account for some of the logical difficulties encountered in trying to apply the statute and controlling precedents.

This battle has proceeded in the agency, the courts and Congress. The latter tried to resolve the matter in 1977 by adding a new provision to the Act, § 123, 42 U.S.C. § 7423 (1982), which has not proved at all free of ambiguity. This court reviewed the EPA's 1982 "stack height" regulations in *Sierra Club v. Environmental Protection Agency*, 719 F.2d 436 (D.C.Cir.1983), *cert. denied*, 468 U.S. 1204, 104 S.Ct. 3571, 82 L.Ed.2d 870 (1984) ("*Sierra Club*"). We affirmed many aspects of those regulations, invalidated two provisions, and directed the agency to reconsider other provisions on remand. In 1985 the agency promulgated a new set of regulations attempting to respond to *Sierra Club*.[3] In these consolidated cases, environmental petitioners led by the Natural Resources Defense Council (and supported by an array of northeastern states)[4] and industry petitioners (sup-

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[3] The 1985 Final Stack Height Regulations at issue here appear at 50 Fed.Reg. 27,892 (1985). After their publication, Title 40 of the C.F.R. was reorganized, and these regulations are now codified at 40 C.F.R. Part 100. This opinion, however, will refer to the C.F.R. cites as they appear in the 1985 *Federal Register* notice.

[4] Petitioners attacking the regulations as insufficiently protective of the environment include NRDC, the Environmental Defense Fund ("EDF"), the Sierra Club, and the states of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. These parties submitted one consolidated brief, and will be referred to collectively as "NRDC" or the "environmental petitioners."

ported by an array of middle western states)[5] challenge the amended regulations. We regret to say that we cannot find them in full compliance with § 123 as construed in *Sierra Club*.[6]

I. Background

This court described the statutory provisions at issue in this case, together with their legislative and administrative history, in *Sierra Club*, 719 F.2d at 439-43, and in our earlier opinion in *Alabama Power Co. v. Costle*, 636 F.2d 323, 388-91 (D.C.Cir.1979). Here we confine ourselves to a brief summary.

Section 110 of the Act directed the EPA Administrator to approve a SIP if it complied with the applicable pro-

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[5] Parties petitioning on the ground that the regulations are too stringent, and intervening in support of the agency against the NRDC challenges, include Alabama Power Co., the American Paper Institute, the National Forest Products Association, United Mine Workers of America, Monongahela Power Co., the National Coal Association, Ohio Power Co., Ormet Corp., and the State of Ohio. These parties have been aided by an *amici curiae* brief submitted by the states of Indiana, Mississippi and Georgia. These parties will be referred to generally as "industry petitioners." Kennecott is an Intervenor in support of the agency's approval of the multipoint roll-back system, an emissions control system challenged by the environmental petitioners.

[6] Prior to oral argument, petitioner NRDC filed a motion for enlargement of time to submit a supplemental appendix. Soon thereafter it submitted a motion to correct the certified index to the record and file its supplemental appendix. These motions were opposed by both the agency and the industry petitioners/intervenors. The industry petitioners in turn filed a motion requesting the opportunity to tender supplemental briefs should we grant NRDC's motions. NRDC's motion for enlargement of time is, at this point, moot. We have reviewed its supplemental appendix and conclude that nothing contained therein affects our disposition of the case. It is therefore unnecessary for us to consider the merits of NRDC's motion or those tendered in opposition. We deny both the motion to correct the certified index and file the supplemental appendix and the industry petitioners' subsequent motion for supplemental briefing.

cedural requirements and included (among other things) "emissions limitations . . . and such other measures as may be necessary to insure attainment" of the NAAQS. 42 U.S.C. § 7410(a)(2)(B). The agency initially approved state plans that authorized the use of "tall stacks" and ICS compliance measures. Several courts found this approach illegal, reading § 110 to establish a hierarchy among control techniques. Under the hierarchial view, "other measures" qualified as "necessary" only to the extent that the SIP had exhausted the "emissions limitations" approach, *i.e.*, only where further compliance through such limitations was "unavailable or infeasible." *NRDC v. EPA*, 489 F.2d 390, 410 (5th Cir.1974), *rev'd on other issues sub nom., Train v. NRDC*, 421 U.S. 60, 95 S.Ct. 1470, 43 L.Ed.2d 731 (1975); *Big Rivers Electric Corp. v. EPA*, 523 F.2d 16, 21-22 (6th Cir.1975) (involving ICS), *cert. denied*, 425 U.S. 934, 96 S.Ct. 1663, 48 L.Ed.2d 175 (1976); *Kennecott Copper Corp. v. Train*, 526 F.2d 1149, 1153-54 (9th Cir.1975) (involving ICS and tall stacks), *cert. denied*, 425 U.S. 935, 96 S.Ct. 1665, 48 L.Ed.2d 176 (1976). (We refer to these cases collectively as the "*NRDC* triolgy.") Round I to the environmentalists.

In 1976 EPA issued guidelines seeking to implement the Fifth Circuit's view of § 110. 41 Fed.Reg. 7450 (February 11, 1976) ("1976 Guidelines"). The guidelines employed a variety of distinctions that continue to haunt the area. First, they focused on the control *credit* that a source could receive for pollution control through stack height. Thus they did not purport to restrict a source's actual employment of a tall stack, but simply limited the extent to which the actual reduction in ground-level pollution achieved by such a stack would count towards compliance with the NAAQS. *Id.* at 7451.

Second, they drew a distinction between stacks that were equal to or less than 2½ times the height of the

facility (the "2.5H" formula) and stacks that were taller, favoring within-formula stacks. *Id.*[7]

Third, they looked relatively askance at *increases* in stack height as opposed to stack heights attained in *original construction*, presumably because the former were more likely than the latter to reflect a purpose to avoid emission reduction costs rather than adherence to conventional engineering practice. *Id.*

Fourth, they employed "grandfathering" concepts both with respect to increases and original construction stacks. For example, they treated the stacks of sources that received construction permits before the Fifth Circuit's decision more favorably than those of sources initiating construction later. *Id.*

This is not the place to describe the rather complex pattern that emerged from all these elements. We will return to aspects of the 1976 Guidelines as we go along. For the moment, we note that credit for control through stacks was to be unlimited if the source applied "the best available control technology" ("BACT"), even for the least favored vintage of stack and for stacks of increased height. *Id.* at 7451-52. Stacks initiated before the Fifth Circuit's *NRDC* decision were grandfathered, up to whatever figure the 2.5H formula might produce. *Id.*

In 1977 Congress stepped in with § 123,[8] moved at lease in part by concern that the 1976 Guidelines were

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[7] In 1981, the agency began defining H as the "height of nearby structure(s)." 46 Fed.Reg. 49,817/1 (Oct. 7, 1981). This minor alteration has no bearing on the current action.

[8] Section 123, 42 U.S.C. § 7423, reads as follows:

> (a) The degree of emission limitation required for control of any air pollutant under an applicable implementation plan under this subchapter shall not be affected in any manner by— (1) so much of the stack height of any source as exceeds good engineering practice (as determined under regulations promulgated by the Administrator), or (2) any other dispersion technique. The preceding sentence shall not apply with respect

too lax. *See Sierra Club*, 719 F.2d at 440. The section in essence elaborates on § 110's references to "other methods," and, to a degree, subordinates the use of tall stacks and other dispersion techniques to emission controls. It creates a new concept, "good engineering practice" ("GEP"), with a complex definition. The methods and distinctions used in the 1976 guidelines reappear, with important variations.

Like the earlier guidelines, § 123 addresses only the issue of *credit* for pollution reduction through dispersion techniques, explicitly stating that the Administrator is not to prohibit increases or restrict stack height. § 123 (c), 42 U.S.C. § 7423(c). Further, it builds in at least some significance for the 2.5H formula,[9] specifying that

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to stack heights in existence before December 31, 1970, or disprsion techniques implemented before such date . . . .

(b) For the purpose of this section, the term "dispersion technique" includes any intermittent or supplemental control of air pollutants varying with atmospheric conditions.

(c) Not later than six months after August 7, 1977, the Administrator, [*sic*] shall[,] after notice and opportunity for public hearing, promulgate regulations to carry out this section. For purposes of this section, good engineering practice means, with respect to stack heights, the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies and wakes which may be created by the source itself, nearby structures or nearby terrain obstacles (as determined by the Administrator). For purposes of this section such height shall not exceed two and a half times the height of such source unless the owner or operator of the source demonstrates, after notice and opportunity for public hearing, to the satisfaction of the Administrator, that a greater height is necessary as provided under the preceding sentence. In no event may the Administrator prohibit any increase in any stack height or restrict in any manner the stack height of any source.

[9] The agency carried the 2.5H formula over from the 1976 Guidelines in its initial effort to give meaning to the GEP concept. 42

GEP height must not exceed that formula unless the source owner demonstrates to the Administrator that such greater height is "necessary" as that term is used in the GEP definition. Third, it employs grandfathering, but in a more limited sense than did the 1976 guidelines, protecting only stacks "in existence" or dispersion techniques "implemented" before the 1970 amendments (December 31, 1970). § 123(a), 42 U.S.C. § 7423(a). § 123's structure differs from that of the 1976 Guidelines in that it draws no explicit distinction between increases in stack height and original construction.

Although § 123(c) directed the EPA to issue regulations implementing its provisions by February 7, 1978, they did not emerge in final form until February 8, 1982. 47 Fed.Reg. 5864. The Sierra Club and the Natural Resources Defense Council challenged the regulations in this court under 42 U.S.C. § 7607(b) and prevailed in part. We will not here summarize the holdings of *Sierra Club*, as a summary would be unnecessary for the cognoscenti, meaningless for others. The important aspects of the decision appear throughout this opinion as we address the many current issues.

The upshot was a remand to the agency, with directions to promulgate new final regulations "within six months from the date of issuance of [the] court's mandate," 719 F.2d at 470. The mandate issued on July 18, 1984, after the denial of certiorari by the Supreme Court,

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Fed.Reg. 57,459 (Nov. 3, 1977). It refined this formula in its 1979 proposed regulations, defining GEP stack height as the height of a nearby structure plus one and a half times the lesser of the height or the width of the nearby structure, or H + 1.5L. 46 Fed.Reg. 2608, 2610 (Jan. 12, 1979). The current regulations except from the H + 1.5L formula those pre-1979 sources that relied on 2.5H. 50 Fed.Reg. 27,906/3 (1985), 40 C.F.R. § 51.1(ii)(2)(i). When we use the term "formula height," we are referring to that height dictated by the stack height formula applicable to the source in question.

468 U.S. 1204, 104 S.Ct. 3571, 82 L.Ed.2d 870. The agency later secured a postponement from the court, and promulgated the final regulations on June 27, 1985. 50 Fed.Reg. 27,892 (1985). Environmental and industry petitioners challenge the revised regulations in this court under 42 U.S.C. § 7607(b)(1), which directs review here for "nationally applicable regulations." Thus, 17 years after the 1970 amendments and 10 years after the enactment of § 123, we again address the permissible scope of reliance on dispersion techniques.

II. Stack Height Validation: Emissions Rate Assumptions in Demonstrations

A. *The Control-First Dispute*

The 1982 Regulations allowed sources to build stacks to formula height and to increase existing stacks to formula height at will. But a source seeking credit for above-formula stacks was required to demonstrate (by fluid modeling or field studies) that the extra height was "necessary" within the meaning of § 123's definition of GEP ("height necessary to insure that emissions . . . do not result in excessive [downwash-induced] concentrations of any air pollutant. . . ."). 47 Fed.Reg. 5865/2 (1982). The agency defined "excessive concentrations" in terms of a "relativist" test: downwash-induced pollutant concentrations were excessive if they exceeded maximum non-downwash concentrations by 40 percent or more *Id.* at 5869/1.

Though the 40 percent figure is not in itself at issue, a word of explanation is in order. In preparing the 1982 regulations EPA found that downwash increased ground-level pollution concentration levels by about 40 percent where a source's stack was at formula height (*i.e.*, 2.5H). *Sierra Club*, 719 F.2d at 446. As Congress had recognized the 2.5H formula as indicative of traditional engineering practice and therefore presumptively sound,

the agency reasoned that any downwash-induced pollution increase exceeding what a formula-height stack would normally produce should be regarded as excessive. *Id.*

In *Sierra Club*, environmenal petitioners attacked the relativist test and prevailed. They argued that Congress was content to give credit to stacks only to the extent that their height was necessary to protect human health, so that a downwash-induced concentration could be "excessive" only if it were health-threatening. 719 F.2d at 447. The 40 percent realtivist test of course had no direct connection with any health threat.

The relativist-absolute dispute appeared to the court in *Sierra Club* to dissolve into the question whether Congress meant in § 123 to codify a traditional engineering formula or to create a health-and-welfare based stack height standard. The court found that the statute and its legislative history "disclose[d] sharply conflicting signals," and concluded, after reviewing the question in detail, that "Congress [probably] thought traditional engineering practice and protection of health were the same thing." *Id.* at 448. But the court also found evidence in the legislative history that Congress recognized that a choice between the two standards would be necessary if traditional engineering practice dictated a height greater than that necessary to protect human health. *Id.* The court concluded that "meeting air quality standards was primary in [Congress's] mind and that good engineering practice was merely a way to do so." *Id.* Finding it unlikely that the 40 percent standard would identify "an absolute pollutant concentration that is dangerous to health," the court remanded to the agency with instructions to "develop a standard directly responsive to the concern for health and welfare that motivated Congress to establish the downwash exception." *Id.* at 450.

The mandate to develop an absolute test revealed an issue that did not exist under the relativist one. Ground-

level concentrations are obviously a function not only of stack height and other elements mentioned in § 123's GEP definition, but also of the emissions emerging at the top of the stack. Once "excessive" concentrations are defined in absolute terms, the stack height "*necessary*" to avoid those concentrations on the ground will obviously vary with a source's actual emissions. Thus *Sierra Club* opened a gap in § 123's GEP definition, the gap expressed in the bracketed and emphasized clause below: "height necessary [*given a specified emissions level*] to insure that emissions from the stack do not result in excessive concentrations. . . ."

Although the parties disagree as to how much the assumed emissions rate affects any computation of creditworthy stack height, they agree on the direction of the impact; high assumed emissions rates entail relatively generous stack credits (and thus relatively high permissible emissions rates), low assumptions the opposite.

EPA's choice of a baseline emissions rate in the 1985 regulations has varied with the particular contexts presented by the rule-making. The critical decisions have related to the "demonstrations" (consiting of field studies or fluid modeling demonstrations) that the regulations require of sources in some circumstances. First, sources seeking credit for any stack height *increase* after original construction must (unless the stack is grandfathered) demonstrate compliance with § 123's GEP definition, even though the height for which credit is sought in *within* EPA's formula.[10] 40 C.F.R. § 51.1(kk)(2). Here, EPA has specified that the baseline must be "the emission rate

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[10] These increases account for a substantial share of the pollution dispersed rather than controlled by the utility industry, but the data before us do not indicate precisely how much. NRDC directs our attention to data suggesting that 168 pre-1970 sources have "doubled" their ability to disperse pollution, NRDC Brief at 9-11, but its data combine the effects of stack height increases with those of merged stacks (a practice discussed in part IV, *infra*). *Id.*

specified by any applicable State implementation plan (or, in the absence of such a limit, the actual emissions rate)." *Id.* NRDC argues that instead the baseline must be that emissions rate which would result from the source's using all "*available methods.*" NRDC Brief at 22 (emphasis added). The parties have dubbed NRDC's contention the "control-first" approach.

EPA also requires a demonstration for any stack height *above* that resulting from its formula (unless the stack is grandfathered). 40 C.F.R. § 51.1(kk)(1). Here it uses as the baseline the rate provided in the "new source performance standards" ("NSPS") promulgated for new power plants under § 111 of the Act, 42 U.S.C. § 7411, unless the source can show that the NSPS rate is unfeasible. This conditional NSPS standard is, of course, a variant of control-first; it is vigorously attacked by industry.[11]

Finally, the baseline emissions rate is relevant to EPA's validation of its formula, a matter that is indirectly at issue here. That validation was based in part on studies from various power plants, the cleanest having an emissions rate of 4.65 pounds of sulphur dioxide per million British thermal units (Btu). J.A. 834. This compares with an NSPS emissions limit of 1.2 pounds per million Btu for plants built between 1971 and 1978, 40 C.F.R. § 60.43(a)(2), and thus obviously does not fit the control-first model.

In this part we address the general question whether § 123 requires use of control-first and conclude that it

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[11] Under the new regulations, sources are also required to undertake GEP stack height demonstrations when a federal, state, or local authority believes that the formula has overestimated their necessary stack height. 40 C.F.R. § 51.1(kk)(3). For purposes of these demonstrations, EPA chose to retain its old relativistic definition of excessive concentrations, and thus had no need to define an applicable emissions rate.

does not. Later sections face the baseline emissions rate problem in the specific contexts already mentioned.

We first address EPA's contention that NRDC's control-first claims are barred by *res judicata*, as it failed to raise the argument in *Sierra Club*. Of course where *res judicata* (claim preclusion) applies, it bars relitigation not only as to all matters which were determined in the previous litigation, but also as to all matters that might have been determined. *Tutt v. Doby*, 459 F.2d 1195, 1197 (D.C.Cir.1972). Moreover, enforcement of the 60-day time limits imposed by the statute providing for review, 42 U.S.C. § 7607(b)(1), requires that issues raised by an initial set of rules be raised within that time limit, not saved for use against the rules that may emerge from a remand.

Neither of these barriers applies here. The issue of the proper baseline emissions rate became ripe only after the *Sierra Club* court remanded for application of an absolute test. While the environmentalists' briefs in *Sierra Club* might have mentioned the issue, they could hardly have induced this court to pass on it before EPA had a chance to do so. They are not, therefore, precluded from raising the matter in the present litigation.

On the merits, we start by noting the scope of our review. If, using "traditional tools of statutory construction," we can discern Congress's intentions in regard to baseline emissions rates, obviously we must give effect to Congress's will. *NLRB v. United Food & Commercial Workers Union, Local 23*, —— U.S. ——, ——, 108 S.Ct. 413, 421, 98 L.Ed.2d 429 (1987) (citations omitted); *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-43, 104 S.Ct. 2778, 2781-82, 81 L.Ed.2d 694 (1984). If we find that "the statute is silent or ambiguous" on the issue, however, we must defer to the EPA's interpretation if it is based upon a "permissible" statutory construction. *NLRB*, —— U.S. at ——, 108 S.Ct. at 421, quoting *Chevron*, 467 U.S. at 843, 844, 104 S.Ct. at 2782, 2783.

Before evaluating the various appeals to the dictionary and to legislative history, we think it suitable to note that the view which NRDC says Congress adopted carries drastic implications. Control-first would require each source to assume, for purposes of its stack height credit demonstration, the lowest achievable emissions rate, determined on either a generic or an individualized basis. Although the record does not allow us to infer exactly the impact of the baseline emissions rate on the emissions rate that would emerge (after the stack height credit were calculated and then used to determine the permissible emissions), all parties agree that that impact is substantial. Indeed, that is what the fight is all about. If Congress in § 123 prescribed the use of such a baseline emissions rate, with all its implications for ultimate emissions ceilings, it did so in a remarkably cryptic way.

In the Clean Air Act Congress has formulated standards for development of emissions limits in a variety of contexts. For example, it provided for generic emissions limits for new sources in § 111, 42 U.S.C. § 7411 (1982), spelling out at length the criteria for calculation of the limits. In a variety of other contexts, it has provided—at length—for determination of the lowest feasible emissions level on a source-by-source basis. *See, e.g.*, 42 U.S.C. §§ 7475(a)(4), 7479(3) (mandating use of the "best available control technology" ("BACT") for new sources in attainment areas, and defining the parameters of the standard); 42 U.S.C. §§ 7502(b)(2), 7501(3) (requiring "lowest achievable emissions rate" ("LAER") for new sources in nonattainment areas, and defining LAER); 42 U.S.C. § 7502(b)(3) (requiring "reasonably available control technology ("RACT") for existing sources in nonattainment areas); 42 U.S.C. § 7491(g) (requiring "best available retrofit technology" ("BART") for pre-1971 sources impairing visibility in national parks and certain other clean areas). NRDC in essence contends that in § 123 Congress mandated agency pursuit

of a similar strategy, but without providing a word of guidance. All NRDC's arguments must be assessed in light of one's estimate of the plausibility of any such scenario. We think it quite unlikely.

NRDC argues that its control-first interpretation is consistent with the plain meaning of the statutory language and is clearly supported by relevant legislative history. It argues further that even if the statute were ambiguous, EPA's interpretation is internally inconsistent and therefore invalid.

NRDC contends that the control-first approach follows inexorably from the plain meaning of the word "necessary." Webster's Third New World Dictionary defines "necessary" to mean essential or "indispensable." *Id.* at 1511. It argues that this definition compels a finding that stack height cannot be "necessary" to control ground level pollution unless the source has employed all feasible emission-control alternatives for reaching the desired levels under downwash conditions. NRDC Brief at 22.

But courts have frequently interpreted the word "necessary" to mean less than absolutely essential, *FTC v. Rockefeller*, 591 F.2d 182, 188 (2d Cir.1979); *9 to 5 Organization for Women Office Workers v. Board of Governors*, 721 F.2d 1, 10 (1st Cir.1983), and have explicitly found that a measure may be "necessary" even though acceptable alternatives have not been exhausted. In *FTC v. Rockefeller*, *supra*, for example, the court said that "the word 'necessary' is not always used in its most rigid sense." 591 F.2d at 188. Specifically, it found that a subpoena could be "necessary" to an FTC investigation even though the Commission had not pursued "reasonably available alternatives." *Id.*; *cf. Chrisner v. Complete Auto Transit, Inc.*, 645 F.2d 1251, 1261-62 (6th Cir. 1981) (statutory term "reasonably necessary" is not absolute and does not require complete absence of alternatives). As these courts have recognized, meaning varies

with context; Webster's definition by no means tells us that Congress intended that the baseline emissions rate—an issue that surfaced only after this court's *Sierra Club* decision—must be premised on the source's having employed all available emissions controls.

NRDC asserts that the legislative history clearly demonstrates Congress's intent to adopt a control-first posture. The House Committee which drafted § 123 stated that it was "intended to ratify the general thrust, if not the specific holdings, of the three U.S. courts of appeals which have considered the issue of the permissibility of use of intermitten controls, tall stacks, and other dispersion enhancement techniques." House Report at 91-92. The cases cited by the House Report are, of course, the familiar ones of the *NRDC* trilogy, and each found that "other measures" for complying with the NAAQS are "necessary," for purposes of § 110(a)(2)(B) review, only when further limits on emissions were infeasible.

We do not believe, however, that legislative history endorsing the "general thrust" of the *NRDC* triolgy demonstrates that Congress in § 123 itself clearly resolved the exact *degree* of hierarchy appropriate in ranking control above dispersion.

Just as the *Sierra Club* court did not anticipate the present issue, we see no evidence that the courts involved in the *NRDC* trilogy anticipated it. Once one recognizes —as Congress indisputably recognized in § 123—that dispersion through stacks can play a quite legitimate role in protecting health and welfare from downwash, it is not by any means obvious that in calculating the appropriate role of stacks one must assume that reduction efforts have been pushed to the point of infeasibility.

Section 123's concept of GEP stack height not only acknowledges a legitimate role for stacks, but endorses engineering practices developed at a time when emissions were largely unregulated. In fact, Congress gave those

practices a specific endorsement in authorizing the EPA to rely on the 2.5H formula in granting credit. *See* § 123 (c) (Administrator is only obligated to conduct demonstrations for above-formula stacks). It is true that this court decided in *Sierra Club* that in any potential clash between defining GEP as that height necessary to avoid downwash-induced effects on human health and welfare, and defining it as 2.5H, the former must prevail. 719 F.2d at 448. But that decision did not undermine the statutory assumption that sources might legitimately rely on stacks aimed at protecting health and welfare from emissions rates such as have prevailed on plants built before Congress's vigorous 1970 intervention into clean air regulation.

Thus it appears to us that the cases of the *NRDC* trilogy simply do not speak to the issue of calculating GEP height, because those courts never even considered the possibility that sources could rely on stacks except when driven to do so by the infeasibility of all alternatives. Legislative history endorsing their "general thrust" therefore cannot answer new questions posed by §123 itself: "Necessary" as used in the GEP definition of § 123 cannot be answered by reference to the trilogy's construction of the word in § 110(a) (2) (B).

NRDC further points to legislative history that in its view suggests that Congress believed credit should be given only for stack heights needed by "well controlled" sources. In discussing its reasons for granting source's credit for GEP stack height, the House Committee explained that

> for many years, good air quality management has meant building a stack sufficiently tall to offset aerodynamic downwash created by structures in the immediate vicinity of the stack. Without some provision for stack height, a plume released downwind of such structure might become engulfed by turbulent eddys

> [*sic*] within the wake of the structure. When this occurs *even the plume from a well-controlled source* may cause air quality standards (or other requirements) to be violated.

House Report at 93, U.S.Code Cong. & Admin.News 1977, p. 1171 (emphasis added).

We find NRDC's reading strained. It seems clear to us that the Committee was merely justifying its decision to grant credit up to GEP stack height with the observation that even well controlled sources may need to rely on the dispersion engendered by a GEP height stack to avoid excessive local ground-level pollution concentration.

Finally, NRDC points to a number of references expressing disapproval of the use of the dispersion effects of "tall stacks" to meet the NAAQS. *See, e.g.*, House Report at 93 ("the courts have determined that the 1970 act prohibited tall stacks as a final compliance method"); Conference Report, H.R.Rep. No. 564, 95th Cong., 1st Sess. 144 (1977), U.S.Code Cong. & Admin.News, pp. 1077, 1171, 1524 ("Tall stacks are not a means of emission limitation under the Clean Air Act of 1970."). But we noted in *Alabama Power v. Costle* that "tall stack" is "a term that really covers a *too-tall stack.* 636 F.2d 323, 389 (D.C.Cir.1979) (emphasis added). Thus the references merely reiterate the Congress's intent to deny stack height credit beyond the hight dictated by GEP; they do not reflect any legislative decisions on how to calculate GEP.

Far from finding a clear Congressional intent to adopt NRDC's control-first strategy, we find the statute's use of the term "necessary" to be completely ambiguous. We find no evidence in the statute or the legislative history that Congress ever thought through the question of how to determine GEP or formulated any view on the "control-first" approach. In view of Congress's endorsement of the historic practice of using stacks to protect health from

downwash-induced pollution, we think the agency, in adopting existing or SIP-required emissions rates as the baseline for demonstrations to support within-formula height increases, gave the statute a quite reasonable interpretation.

NRDC asserts that even if we find the statute to be silent as to the appropriate emission level assumption, we should reject the agency's approach as internally inconsistent and therefore arbitrary and capricious. *See* 5 U.S.C. § 706(2)(A). As noted above, while EPA authorizes use of existing or SIP-required emissions as the baseline for justifying *within-formula* increases, 40 C.F.R. § 51.1(kk)(2), it requires an assumption of NSPS emissions for demonstrations needed to justify *above-formula* stack heights, 40 C.F.R. § 51.1(kk)(1). NRDC claims that as NSPS is defined in terms of technological and economic feasibility, the latter provision reflects the agency's partial acceptance of the control-first approach. The agency's treatment of within-formula increases, it says, is hopelessly inconsistent with its view of above-formula stacks. NRDC Brief at 28-29.

The EPA explained in the rulemaking that it rejected use of existing emissions in the above-formula context for fear of impermissible circularity—"to the extent that [a source's preexisting emissions] limit relied on greater than formula hight, it would amount to using a tall stack to justify itself." *See* 50 Fed.Reg. 27,898/2. But we think that §123 left the agency free to regard this circularity as permissible in the within-formula context, impermissible in the above-formula context. EPA explained that its use of NSPS (the stringent standard applicable to new sources) for above-formula stacks conformed to Congress's expectation that the "credit for stacks above formula height . . . be granted only in rare cases." 50 Fed.Reg.27,898/1.

NRDC is certainly correct when it notes that the circularity problem that attends the use of existing emis-

sions levels for above-formula demonstration purposes also applies to within-formula demonstrations. Where the formula has overstated the stack height necessary to avoid excessive ground level concentrations, the SIP or existing emissions levels may reflect the benefit of the erroneous assumption, so that its use in a within-formula stack height demonstration will inflate the "necessary" stack height. The problem, however, is plainly less severe than in the above-formula height context. The initial stack height credit was by definition within-formula, thus limiting the source's existing emissions rate, and thus the extent to which the laxity of the process may inflict potential damage. The reliance on the formula in the initial computation establishes an outer bound on the degree of error. This is quite different from the risks entailed by use of existing rates in the above-formula context, precisely where both this court and Congress itself have warned the agency to extend credit only with "utmost caution," *Sierra Club*, 719 F.2d at 450.

Accordingly, we reject NRDC's contentions that § 123 prohibits use of existing emissions rates in within-formula demonstrations and that the discrepancy between the baseline assumptions for above- and within-formula demonstrations renders the latter arbitrary and capricious.

B. *Demonstrations Supporting Stack Height Increases Within the Formula.*

1. *Attacks on the formula.* In the *Sierra Club* litigation the environmental petitioners did not directly challenge the accuracy of the stack height formula. (By then the 2.5H formula had evolved into H + 1.5L, where L refers to the lesser of the height or width of any structure near the stack. Some references are to formulas in the plural because the old 2.5H persisted as to some grandfathered stacks.) They did, however, attack the agency's failure to require demonstrations to justify

stack height credit in either of two special cases: (1) when a source raised a preexisting stack, and (2) when federal, state or local authorities believed the formula had overstated the necessary stack height. The EPA in turn defended the omission of such demonstration requirements largely on the ground of the formula's accuracy. 719 F.2d at 456. The court found this faith unsupported by the record, as it was explicitly based on the agency's erroneous relativistic conception of "excessive concentrations." [12] *Id.* at 458. The court therefore held that the agency had not considered whether the formulas were an accurate enough measure, in light of the construction of "excessive" concentrations as related to health and welfare, to justify dispensing with a demonstration requirement in the two special cases. It remanded for that reconsideration. *Id.* Thus, despite the absence of direct attack, the *Sierra Club* decision invited reconsideration of the formula, by suggesting to EPA that superior validation of the formula was an alternative to adopting demonstration requirements in the areas specifically found to be vulnerable.

On remand, the agency provided demonstration requirements not only for the two circumstances specifically disputed in the preceding litigation, 40 C.F.R. § 51.1(kk)(2) (stack height increase demonstrated), 51.1(kk)(3) (governmental authority instigated demonstration), but also for sources with porous structures or buildings whose shapes are areodynamically smoother than the simple structures on which the formulae were based. 50 Fed. Reg. 27,900/2 (explaining the reach of 40 C.F.R. § 51.1

[12] The agency had derived its concept of "excessive" from the formula itself, defining excessive emissions as ones exceeding the percentage increase in ground level concentrations normally occurring with formula height stacks during periods of downwash. 50 Fed.Reg. at 27,893/3; *and* see pp. 1233-1234 *supra*. Its subsequent finding that the formula predicted the minimum stack height necessary to avoid excessive concentrations was as unsurprising as it was circular.

(kk)(3)). Given these demonstration requirements, nothing in our *Sierra Club* opinion required EPA to re-evaluate the accuracy of its formula. Accordingly, consideration of deficiencies in the formula is barred by *res judicata* (and by the time limits of 42 U.S.C. § 7607(b)(1)), unless we find that the demonstration procedures chosen by EPA are insufficient to fulfill the statutory purposes. We now turn to that issue.

2. *Attacks on the demonstration procedures.* In *Sierra Club* this court found it proper to assume that large plants of the sort at issue here would have been built in accordance with "good air quality management" practices, or, effectively, GEP as the term is used in § 123. 719 F.2d at 459. The corollary of this was an assumption that post-construction stack increases were not justified by any need to correct downwash-induced dangers to health and welfare. The court said that this assumption could be rebutted in individual cases "only by a reliable indicator" of the height needed for that purpose. *Id.*

EPA responded by imposing demonstration requirements. Under the 1985 regulations, sources seeking credit for height increases must show, through fluid modeling or wind tunnel demonstrations, that the increase is necessary to avoid downwash that would otherwise exceed at least one of several health- or welfare-related criteria (applicable NAAQS, "prevention of significant deterioration" standards covering areas in full attainment of the NAAQS under § 7475(a)(4), or levels amounting to a local nuisance). 40 C.F.R. § 51.1(kk)2). As noted above, a source is to assume for the purposes of the demonstration an emission level equivalent to the applicable SIP, or, if no SIP applies, to its actual emissions rate. *Id.*

NRDC argues that these emissions rate assumptions undermine the demonstrations, denying them the reliability demanded by *Sierra Club*. As we have noted, an

assumption of existing or SIP-required emissions rates plainly gives the demonstrations a certain circularity: the now existing or required emissions rate will have been based on a given stack height, which will then be used to justify a stack height. NRDC Brief at 29.[13] NRDC argues that instead EPA was required to assume the best achievable emissions rate. *Id.* at 22.

We have already rejected NRDC's claims that failure to employ control-first assumptions directly violates § 123 or is arbitrary and capricious in light of EPA's own condemnation of circularity and partial adoption of control-first for above-formula demonstrations. The sole question currently before us, then, is whether EPA's use of existing rates in this context is so defective as to fall short of *Sierra Club*'s reliability requirement.

We note at this point that the agency's failure to establish perfect logic in support of its emissions baseline decision may well stem from the nature of § 123 itself. While its goal is the reduction of overall pollution loadings, at least in part with a view to protect against acid rain in regions distant from the sources, it operates solely on the *means* by which sources meet national goals for *local* health and welfare. It would be startling if implementation of this process did not involve a few logical imperfections.

There appears, in fact, to be no completely logical basis on which to select a baseline rate for any demonstration. If EPA were to use NSPS for all demonstrations, for example, demonstrations would in a sense underpredict the appropriate stack height for sources with higher

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[13] NRDC does not suggest that under EPA's regulations a source could *increase* its emissions and raise its stack, justifying the stack height (and thus the increased emissions) by demonstrations employing the latter rate. We do not read the reference in 40 C.F.R. § 51.1(ff)(2) to "the actual emission rate" to encompass such a scenario.

emissions rates. Assumption of a single *high* emissions rate, conversely, would overpredict the appropriate stack height for cleaner plants. But selecting each plant's existing permitted rate is subject to the circularity objection. In this world of imperfections, we think EPA's choice reasonable. This is particularly so in light of Congress's having obviously contemplated reliance on a historic notion of "good engineering practice," a notion developed during an era of relatively primitive emissions controls. We do not find EPA's methodology for the conduct of within-formula demonstrations arbitrary or capricious.

C. *The NSPS Presumption for Above-Formula Stacks.*

In developing a baseline emissions rate for demonstrations to justify above-formula stacks, EPA initially proposed that sources assume "either (1) the existing, approved emission limit; (2) any applicable technology-based emission limit, such as the new source performance standards (NSPS); or (3) the emission limit that would result from the use of GEP formula stack height, whichever is applicable to the source being modeled." 49 Fed. Reg. 44,882/1. The last phrase clearly indicates that NSPS would be used only for plants to which it applied by virtue of § 111. The final rule was dramatically different. It required each source to assume NSPS emission levels, or, if it could show those to be infeasible, the lowest achievable levels. 40 C.F.R. § 51.1(kk)(1). Industry petitioners strenuously object to this conditional-NSPS assumption on both substantive and procedural grounds.[14]

[14] NRDC does not directly challenge the agency's above-formula stack height demonstration provisions, which mandate a NSPS emissions level assumption, subject to feasibility constraints. But it does object to EPA's proposals for gauging feasibility, set forth in certain "guidance memoranda." NRDC Brief 28 n.54. This court has previously held that the memoranda at issue do not represent

1. *Substantive objections.* Petitioners raise three distinct challenges to the agency's decision to adopt the NSPS presumption.[15] First, they argue that because Congress did not prescribe the use of a techonolgy-based emissions limit for GEP fluid modeling demonstrations, the Administrator lacks the authority to mandate its use. Alabama Power Brief at 19. As we have already noted in our discussion of NRDC's control-first argument, Congress imposed technology-based emission limitations—NSPS, BACT, LAER, RACT and BART—in a variety of situations. Two of these, BART and RACT, govern pre-1971 sources. 42 U.S.C. §§ 7502(b), 7491(b)(2)(A). Industry petitioners would have us infer from the contrast between those express conferrals of authority, and the absence of any such reference here, that Congress denied EPA the authority to assume such an emissions rate.

We find the attempt of industry to bar control-first here is not stronger than NRDC's effort to require it in the within-formula context. As we noted in discussing NRDC's theory, the record raised considerable doubt whether anyone in Congress even recognized the issue. The silence alone seems to support neither a requirement nor a prohibition. What Congress did in § 123 was to grant broad discretion to the agency, requiring owners of above-2.5H stacks to demonstrate the necessity for the higher stacks "to the satisfaction of the Administrator." 42 U.S.C. § 7423(c). In *Sierra Club* we read the section to mean above-2.5H credit should be granted only with

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final agency action subject to review. *NRDC v. Thomas*, No. 85-1834 (D.C. Cir. Aug. 3, 1986) (Order dismissing petition for review).

[15] Besides the three is a frivolous effort to prove that EPA mistakenly read *Sierra Club* as mandating the use of NSPS. This is patched together from arguments in EPA's brief explaining how its efforts to meet the *Sierra Club* remand, coupled with defects in alternative emissions baselines, led it to choose NSPS.

the "utmost caution," 719 F.2d at 447, which the selection of the NSPS baseline seems to reflect.

Second, industry petitioners assert that the use of the NSPS presumption only for *above*-formula stack height demonstrations will unfairly prejudice sources located in mountainous terrain, since it is in such areas that above-formula stacks are most likely to be found. Industry petitioners argue that this contravenes the will of Congress. Alabama Power Brief at 34. In *Sierra Club*, however, we found a congressional recognition "that the tall stacks provision would have a disproportionately heavy impact on polluters in mountain areas." 719 F.2d at 455. In fact, the court found an affirmative intent to "discourage utilities from locating in hilly terrain, because such locations tend to require very tall stacks, leading to a greater dispersion of pollutants." *Id.* at 445. The court adopted that construction in the context of rejecting EPA's claim that it could consider "plume impaction" in computing excessive concentrations. *Id.* at 452-56. As that decision applied even to plants contsructed before the adoption of § 123, whose owners were obviously not free to respond to its "discourag[ing]" influence, *Sierra Club*'s interpretation of congressional non-solicitude for plants in hilly terrain was a strong one. Any disadvantages inflicted on such plants by EPA's choice of the NSPS baseline fit readily within our prior reading of the law.

Finally, the industry petitioners assert that in order to use the NSPS presumption, EPA must be able to point to substantial evidence that it is attainable by most of the affected sources. But as EPA allows any source to use a higher emissions rate when NSPS is infeasible, there is no need for any sort of generic demonstration that it is normally so. Nor was it improper for EPA to place the burden of showing infeasibility on the source owner, rather than assuming the burden of showing feasibility. Congress appears to have intended that above-

formula stack height be approved only in "rare circumstances." House Report at 93, U.S.Code Cong. & Admin. News 1977, p. 1171. *Cf. Sierra Club*, 719 F.2d at 450 ("utmost caution" to be exercised in granting above-formula credit). EPA's location of the burden is thus rationally related to the purposes of the statute and well within the Administrator's discretion.

2. *Procedural challenges.* As described above, EPA initially outlined a scheme through which each source would assume its "applicable" emissions rate for purposes of above-formula demonstrations: (1) sources subject to technology-based emission limits would assume those rates; (2) sources not subject to such limits would assume their existing, approved SIP limits; and (3) sources not subject to either of the above would assume the limit that would result if they were to operate with the stack height credit that the formula would produce. 49 Fed. Reg. 44,882/1. Less than two weeks before promulgating the final regulations, the agency informed industry representatives of its decision to adopt instead a uniform (but conditional) NSPS presumption. Because time was short, industry representatives were only able to respond with two short letters strongly urging reconsideration of the new rule. J.A. 1483, 1491 (letters from the Utility Air Regulatory Group ("UARG") and American Electric Power Company). Industry petitioners now assert that this abrupt shift denied them the opportunity to comment afforded by § 4 of the Administrative Procedure Act, 5 U.S.C. § 533.

In the preamble to its Final Rule, the agency sought to undermine this claim by characterizing its 1984 proposal as presenting three distinct alternatives, rather than a coherent three-part scheme. 50 Fed.Reg. 27,898/2. This is quite disingenuous. Nothing in the initial formulation suggested that EPA intended to adopt one of the three rates for universal use. And where EPA was offering alternatives from which it intended to make a choice in

its final rule, it said so. *See, e.g.*, 49 Fed.Reg. 44,881/1 (proposing and soliciting comments on two alternatives for the definition of "excessive concentrations"); 44,884/1 (proposing and soliciting comments upon three approaches for modeling "nearby" terrain features).

The EPA can obviously promulgate a final regulation that differs in some respects from its proposed regulation. We recognized in *International Harvester Co. v. Ruckleshaus*, 478 F.2d 615, 632 n. 51 (D.C.Cir.1973), that "a contrary rule would lead to the absurdity that . . . the agency can learn from the comments on its proposals only at the peril of starting a new procedural round of commentary." Thus, this court has held under both the APA and the Clean Air Act that the agency's final rule must only be a "logical outgrowth" of its proposed rule. *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 547 (D.C.Cir.1983) (citing circuit precedent on this matter).

We think the agency's ultimate choice qualifies—if barely—as a logical outgrowth of the original proposal. Obviously the germ of NSPS was there, as one of the possibly-applicable technology-based limits. Moreover, the primary concern that drove EPA *away from* allowing sources to use existing SIP limits (and thus towards NSPS) was obvious at an early stage: NRDC's constantly asserted control-first theme. *See* 51 Fed.Reg. 27,898/2 (agency rejects use of existing SIP emissions limits because "to the extent that [a source's limit] relied on greater than formula height, it would be using a tall stack to justify itself").

To be sure, EPA never explained in the administrative proceeding why it rejected use of the emissions rate that would flow from use of the formula. In fact, in its Response to Comments the agency defended this option against environmentalist charges that it was incurably circular. J.A. 314-15. Here the agency's lawyer explained

that the formula emissions level assumption was inappropriately strict. EPA Brief in *Ohio Power*, Nos. 86-1331, 86-1362, at 28-29. However valid this critique may be, it is little help in showing the *agency's* intellectual path to the NSPS choice. However, as neither the industry petitioners nor anyone else in this litigation advocates that choice, it can hardly have been so attractive that its disappearance came as a shock.

Further, the public comments raised the possibility of adopting a single, technology-based limit. The New York State Attorney General's Office suggested an NSPS assumption for all demonstrations. J.A. 434. This gave industry participants a clear opportunity to shoot the idea down. NRDC attacked each of the three limits set forth in the 1984 proposal, J.A. 829-33, and advocated use of the rate that would result from use of "the maximum degree of control available to the source." *Id.* at 832 n. 6. Though the target raised by this contention was broader than NSPS, it certainly gave industry critics an opportunity both to shore up the non-NSPS components of the original proposal and to attack *any* form of control-first. Nor was industry free to discount these proposals merely because they came from parties favoring a control-first reading of the statute, *see* Alabama Power Reply Brief at 15; there was a clearly foreseeable risk that EPA would reject the environmentalists' reading of the law but proceed to adopt control-first as a matter of choice. This, in essence, is what it did in a limited sphere.

Finally, EPA's warning of the NSPS threat, communicated two weeks before promulgation, gave industry petitioners at least a limited opportunity to focus a direct attack on NSPS. Though severely pressed, they managed to file objections 7-10 days before the final regulations were signed. J.A. 1483, 1491.

Although this case stretches the concept of "logical outgrowth" to its limits, we think it does not reach the breaking point. The NSPS assumption appears to have

emerged from the agency's notice and comment process, as the agency responded to others' comments by stripping away the components of the original proposal that it concluded were more vulnerable. Of course, our affirmance of EPA on this point does not require it permanently to resist useful suggestions or critiques that may emerge.

III. Stack Grandfathering Issues

The agency has in several cases grandfathered stacks and in one instance rejected an industry request for grandfathering treatement. NRDC attacks several elements of the grandfathering as too generous; several firms (including one heavy buyer of electricity) attack the rejection of their claim. The decisions at issue are as follows:

1. EPA limited its demonstration requirement for within-formula stack height increases to "sources seeking credit after October 1, 1983 [10 days before our decision in *Sierra Club*]." 40 C.F.R. § 51.1(kk)(2). (The preamble makes clear that the date refers to the time owners *raised* the stack, not the time they "sought" credit. 50 Fed.Reg. 27,899/2.)

2. EPA affords credit up to 2.5H, free of any demonstration requirements (including such as might be imposed by state or local air pollution authorities), for any stack in existence on January 12, 1979, the date when EPA first proposed the more sophisticated formula, H+1.5L. Pursuant to our remand in *Sierra Club*, this is limited to cases where the owner or operator produces evidence of having relied on the 2.5H formula in establishing its emission limitation. 40 C.F.R. §§ 51.1(ii)(2)(i). EPA also affords credit up to H+1.5L or any stack in existence on January 12, 1979, regardles of reliance. *Id.* at § 51.1(ii)(2)(ii).

3. For purposes of the grandfathering explicitly afforded by § 123, for stacks "in existence" before Decem-

ber 31, 1970, EPA in the 1982 regulations defined "in existence" in terms of the start of continuous construction or entering into certain types of contracts. 40 C.F.R. § 51.1(gg). We upheld this in *Sierra Club*, 719 F.2d at 464-66. NRDC claims that EPA should have revised this definition in the light of later discoveries about the number of plants advantaged by the grandfathering.

4. EPA has refused to provide any grandfathering for plants that prior to the Final Rule conducted demonstrations to justify above-formula stacks, even though the demonstrations conformed entirely to the then-applicable rules. J.A. 64-65.

Some general principles are applicable to all these issues. First, none of them is governed by the rule adopted in *Georgetown University Hospital v. Bowen*, 821 F.2d 750, 756-58, 760 (D.C.Cir.1987), generally invalidating retroactive rules. The rules there at issue would have limited reimbursements for *past transactions*. All that is at stake here are restrictions on plants' *future emissions*. Retroactivity is involved here simply because enforcement of the demonstration requirement might impinge unfairly on source owners that made investments or other commitments in reasonable reliance on prior understandings.

Second, our decision in *Sierra Club* observed that some of the considerations governing an agency's duty to apply a rule retroactively were

> (1) whether the new rule represents an abrupt departure from well established practice or merely attempts to fill a void in an unsettled area of law, (2) the extent to which the party against whom the new rule is applied relied on the formed [sic] rule, (3) the degree of the burden which a retroactive order imposes on a party, and (4) the statutory interest in applying a new rule despite the reliance of a party on the old standard.

719 F.2d at 467 (quoting *Retail, Wholesale & Department Store Union v. NLRB*, 466 F.2d 380, 390 (D.C. Cir.1972)). Clearly the issue entails a balancing of the interest in prompt and complete fulfillment of statutory goals against the inequity of enforcing a new rule against persons that justifiably made investment decisions in reliance on a past rule or practice. *Cf. Retail, Wholesale & Department Store Union v. NLRB*, 466 F.2d at 390; *Associated Gas Distributors v. FERC*, 824 F.2d 981, 1040 (D.C.Cir.1987).

We now turn to the specific complaints.

A. *Sheltering pre-October 1, 1983 Within-Formula Stack Increases from the Demonstration Requirement*

At the outset, EPA invites us to discard NRDC's objection by means of an argument that to us is quite obscure: that the *Sierra Club* court did not insist on a retroactive demonstration requirement, or indeed on any demonstration requirement at all. EPA Brief at 34. The premise seems to be that because EPA's adoption of a demonstration requirement was voluntary, it need not explain its decision not to impose the requirement on pre-1983 increases. The argument does not add up. First, EPA's adoption of a demonstration requirement for increases could be viewed as wholly voluntary only if EPA had set out thoroughly to validate its H+1.5L formula. This it did not really purport to do, although its preamble contains some favorable—and hotly disputed—observations on the subject.[16]

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[16] The agency asserts that "[s]tacks below formula height are associated with downwash-related violations of the [3-hour SO_2, NAAQS] where emission rates significantly exceed the level specified by NSPS." 50 Fed. Reg. 27,987/3. To back up this assertion EPA relies primarily upon its evaluation of five fluid modeling studies which, it claims, demonstrate significant exceedances of the NAAQS. *Id.* at 27,897/1. NRDC argues that because these studies measured only ten-to-fifteen minute concentrations, they cannot be

In any event, the agency found, in light of this court's reading of § 123 in *Sierra Club*, that a demonstration requirement was suitable. That being so, exemption of a large class of increased stacks is an important decision subject to attack as possibly arbitrary and capricious. It would fail that test if it is inconsistent with the retroactivity analysis set forth in *Sierra Club*.

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taken to demonstrate NAAQS exceedances. NRDC Brief at 37-38. As wind speed and direction are highly variable in the real world, one cannot simply extrapolate ten-to-fifteen minute averages to estimate pollution averages for longer periods. Thus, the normal practice is to apply a conversion factor to short-term wind tunnel results. *See e.g.*, "Eastlake 1980" study at B4-B6, J.A. 111-12; EPA Brief at 23. Environmental petitioners contend that if the agency had applied a standard conversion factor to the EPA studies, the results would demonstrate conclusively that even the comparatively dirty plants tested did not need formula height stacks to avoid NAAQS exceedances. NRDC Brief at 38. In response EPA asserts only that its analysis of meteorological data for each plant convinced it that use of a conversion factor was not warranted.

In addition to its NAAQS exceedances rationale, the agency asserts that the formula is necessary to prevent short-term emissions peaks that "raise a real prospect of local health or welfare impacts." 50 Fed. Reg. 27,987/3-98/1. We have no doubt that the agency is permitted to consider hazardous short-term conditions as within the sphere of "excessive concentrations." *Cf. Sierra Club*, 719 F.2d at 447 (state nuisance law may provide a proxy for excessive concentrations). However, the agency provides no support for its assertion that the current formula predicts the stack height necessary to avoid such short-term hazards.

EPA has stated that it did not rely upon industry data to support its short-term peaks rationale, Response to Comments at 40, J.A. 308, and has specifically disavowed reliance upon the only other study cited in its preamble that supports its short-term peak conclusions (Huber & Pooler, "Comments on Peak Ground-Level Concentrations Due to Building Downwash Relative to Peak Concentrations Under Atmospheric Dispersion Processes" (June 10, 1985), J.A. 129). *See* EPA Brief at 27. And while the agency points out that the ten-to-fifteen minute concentrations measured in the fluid modeling studies exceeded the 1300 microgram per cubic meter level specified in the three hour NAAQS, it does not demonstrate that short-term exposures at that level are hazardous.

Invoking the first factor identified by *Sierra Club*, NRDC argues that here there simply is no "well-established practice." A fluctuating rather than well-established practice presumably counts against grandfathering, as it undermines the actor's claim that its reliance was legitimate. In fact, the record indicates considerable waffling by EPA. There appear to have been new policy moves in 1973, 1976, 1979, 1980, and 1981 and 1982. In its 1973 Guidelines, it actively encouraged sources with short stacks to increase to GEP formula height. 38 Fed.Reg. at 25,701/2 (1973) ("The increase of stack height up to a height consistent with good engineering practice is acceptable without qualification.... For fairly level terrain, good engineering practice is normally taken to be a stack height 2½ times the height of the facility or nearby structure."). In 1976 it responded to the circuit courts' disparaging treatment of its 1973 effort with considerable severity: putting aside stack increases started before the Fifth Circuit's *NRDC* decision, the 1976 guidelines gave credit only for increases by sources that applied BACT ("best available control technology"). 41 Fed.Reg. at 7451/2-3 (1976). In 1979, after Congress's adoption of § 123, the agency proposed regulations considerably less stringent, allowing sources that raised existing stacks automatic credit up to H + 1.5L, with the proviso that the EPA or a state or local control agency could order the source to justify use of the formula height by demonstrating, through fluid modeling, the existence of "an air quality problem, attributable to downwash." 44 Fed.Reg. at 2614/1 (Jan. 12, 1979). In a 1980 "policy change," sparked by a heightened concern "that use of its GEP formula for stack height increases [was] increasing pollutant loadings and acid rain," the agency tightened again, announcing its intention to require fluid modeling demonstrations for all future stack height increases. 45 Fed. Reg. 42,282/1 (June 24, 1980). Eleven months later, the EPA drew back, leaving in place the scheme adopted

in its 1979 proposed rules. 46 Fed.Reg. 28,650 (May 28, 1981). The agency's 1982 Final Regulations moved further in the direction of leniency, granting automatic credit up to formula height for sources raising existing stacks, with no provision for support through demonstrations. 47 Fed.Reg. 5868/3 (1982). Of course it was this rule that the *Sierra Club* court remanded for reconsideration. 719 F.2d at 458-59.

Clearly the legitimacy of increasing stack height in reliance on regulatory policy has varied radically from period to period. The equities for a firm increasing its stack in the 1976-79 era are slight compared to ones that increased under the 1973, 1979 or 1981 policies. Besides, the policies represent a scatter rather than a clear line, reducing the equities for reliance even on the moments of lax policy. Finally, equitable claims have some tendency to degrade over time; a 15-year 1973 contract for the purchase of high-sulphur coal may have loomed large in 1976 but hardly amounts to anything in 1987.

EPA's defense of its grandfathering decision failed to focus on any of these difficulties. *See* 50 Fed.Reg. at 27,899/3-900/1. Indeed, EPA's policy imposed no requirement of reliance at all, even though it was precisely that omission that persuaded this court to remand the grandfathering issue raised in *Sierra Club*. 719 F.2d at 468.

Against the seemingly weak claims for grandfathering is the possible frustration of the statutory goal. This looks significant. The vulnerability of the formula persuaded EPA to require demonstrations. These demonstrations are impaired by the circularity problem that EPA has recognized. Yet EPA's grandfathering rule allows most of the affected sources to escape even this modest check.

Administrative problems may partly explain EPA's generous grandfathering. An immediate run of demonstrations for all sources that have increased stack height since 1970 would evidently tax the capacity of the facilities for running such demonstrations. EPA Brief at 18. But this alone appears a weak justification, as EPA has the alternative of adopting a formula clearly valid enough to dispense with demonstrations altogether.

Thus we find it necessary to remand. We do not say there is no room for grandfathering on these facts, but the case for it seems unusually weak. Any grandfathering chosen should fit, to a reasonable degree, the variations in regulatory history and degrees of reliance. We recognize, of course, that administrative necessity or *de minimis* principles will prevent a perfect fit; EPA could not be expected to match the six layers of regulatory policy with a six-layer grandfathering scheme. But fidelity to the congressional purpose requires a far more careful effort to address the problem than the agency has yet made.

B. *Automatic Credit to Formula Height for pre-January 12, 1979 Stacks*

The regulations provide credit for heights up to formula levels for sources originally built or subsequently raised before January 12, 1979. 40 C.F.R. §§ 51-1(ii)(2)(i) and (ii). As now written, the rule shelters such sources not only from the requirement of demonstrations initiated by state or local authorities, 40 C.F.R. § 51.1(kk)(3), but also from the demonstration requirements for stack increases. For purpose of our present discussion, we assume that on remand EPA will look to our analysis in part III.A in deciding to what extent (if any) it will shelter older within-formula *increases* from the new demonstration requirements. Acccordingly we limit our consideration here to the 1979 grandfathering provision only insofar as it shelters stacks from state-

initiated demonstration requirements and only insofar as it applies to credit for stacks at or within their original heights. The rules have this effect for (1) credit up to 2.5H for pre-1979 stacks of sources whose owners relied on the 2.5H formula and (2) credit up to H + 1.5L for all pre-1979 stacks regardless of reliance.

At the outset, and applicable to both types of grandfathering, is the question whether freedom from the necessity for supplying demonstrations, at the behest of government authorities, is of any great importance to the realization of the goals of the Clean Air Act. We cannot detect much importance. As a practical matter, it seems likely that virtually all such requirements would originate with a state, or with a local entity acting with the authority of the state. But 42 U.S.C. § 7410 leaves states completely free to establish more stringent pollution controls than EPA. *See Indiana & Michigan Electric Co. v. EPA*, 509 F.2d 839, 844 (7th Cir.1975); *Appalachian Power Co. v. EPA*, 477 F.2d 495, 498 (4th Cir.1973). Thus no EPA rules on demonstrations could bar a state from insisting on the most onerous demonstration imaginable. The failure to provide for such a demonstration for pre-1979 sources seeking credit within the formulae thus has little practical effect; the statutory interest in retroactive application is modest. On the other hand, the agency must supply some reason for treating pre-1979 sources more leniently than later ones. We now turn to that problem in the 2.5H and H + 1.5L contexts.

1. *Credit up to 2.5H for pre-1979 sources showing reliance.* In *Sierra Club*, we made clear that the agency was to either justify its faith in the accuracy of the formula or provide a mechanism through which local authorities could force sources within their jurisdiction to prove their need for formula height stacks. As noted in part III.A above, the agency failed to properly validate its formula. It chose instead to promulgate a state-

initiated demonstration provision, 40 C.F.R. § 51.1(kk)(3), subject to the grandfathering here at issue.

We have no difficulty upholding this limited shelter. We found in *Sierra Club* that calculation of GEP through use of the 2.5H formula was, until 1979, an established practice and that protection of sources relying on such a practice in their original construction would not "maintain a situation that Congress sought to end." 719 F.2d at 468. Moreover, the states' alternative route to control, noted above, further dilutes the interests supporting retroactivity.

NRDC first contends that EPA's failure to advance a full substantiation of even the H + 1.5L formula utterly prevents it from allowing automatic credit for stacks *originally constructed* in reliance on the 2.5H formula. But the environmental petitioners in *Sierra Club* did not attack the formula at all and attacked the want of demonstrations only for stack height increases and instances where local authorities were concerned that the formula might over-predict GEP. Thus, once the state option to be more severe is recognized, *Sierra Club* left EPA quite free so far as concerns within-formula original-construction stacks. The sole constraint was that, in grandfathering the difference (for original-construction stacks) between the height yielded by the 2.5H formula and that yielded by the newer H + 1.5L, EPA must afford the benefit only to firms actually relying on the 2.5H figure. 719 F.2d at 468. The agency responded to that aspect of the remand by explicitly conditioning grandfather treatment under the new regulations on such a showing of reliance. 40 C.F.R. § 51.1(ii)(2)(i).

NRDC's second objection relates to the exact terms of the reliance requirement. The grandfathering is available where the source owner establishes its reliance on the formula "in establishing an emission limitation," 40 C.F.R. § 51.1(ii)(2)(ii), meaning, all agree, that the

agency looks to the source's emission rate rather than its actual stack height. *See also* 50 Fed.Reg. 27,901/2. Thus, if a source built a stack taller than 2.5H, but set its emission limits assuming 2.5H credit, the agency will concede that "a convincing demonstration has been made that the source properly relied on the formula." *Id.* at 27,901/3. Conversely, if such source based its emission limits "on some other stack height credit, such as 2.8H, 3.5H or some other number," the agency would infer that it had not relied on the formula. *Id.*

Here NRDC's objection flows from its reading of our decision in *Sierra Club*. It believes that case to preclude grandfather treatment for sources with stacks taller than 2.5H, relying heavily on the following paragraph, especially its last sentence:

> We hold that the statute does not prevent EPA from allowing its past rule to be applied to stacks built before its new formula was proposed, but that the agency has erred in allowing sources that did not rely on the old formula to use it. Congress was moved to enact section 123 by evidence that during the 1970's many sources had built tall stacks far above the heights dictated by sound engineering practice. To allow such sources to claim credit for heights up to the 2.5 Rule would be a windfall for them, unjustifiable under either the statute or the equitable considerations that govern retroactivity.

719 F.2d at 467.

The paragraph taken as a whole simply states that allowing sources with above-formula height stacks to claim 2.5H credit *without a demonstration of reliance on the 2.5H formula* would be unlawful. That it does not require EPA to deny credit for the dispersion effects of the part of a tall stack fitting within the 2.5H formula is reinforced by the court's discussion of the burden of retroactivity. The court observed that such a burden

might take the form of expensive retrofitting of control equipment or renegotiation of coal contracts. *Id.* at 468. As these consequences derive from the need to change emission limitations, and not from the height of the stack itself, it is clear that the court believed that a source could demonstrate the requisite reliance by demonstrating that it had set its emission limits by reference to the 2.5H formula. As the statute does not regulate actual stack height (and in fact specifically forbids the Administrator from doing so, § 123(c), 42 U.S.C. § 7423(c)), but rather regulates stack height credit, it would be perverse to make grandfathering depend on actual stack height rather than upon emission limitation decisions driven by expectations of allowable credit.

2. *Credit up to H + 1.5L for pre-1979 sources not showing reliance.* As noted above, the states' complete freedom to impose demonstration requirements appears to sap this particular grandfathering of any great significance. Nonetheless, in drawing a distinction between pre-1979 and later stacks, the agency must supply some reason. In this context we cannot identify one.

Before EPA introduced the H + 1.5L formula in its 1979 proposal, the 2.5H formula was the only formula sanctioned by the agency. Thus, not only does the agency not impose a reliance requirement in this context, but we cannot understand how a pre-1979 source could have relied on H + 1.5L. Even when the statutory interest in applying a rule retroactively is slight, an agency must articulate some equitable rationale for grandfathering. Although we cannot say that there is none, we cannot upheld the decision in the absence of any explanation.

C. *EPA's Definition of "Stack Height in Existence"*

In *Sierra Club* petitioners contended that EPA's definition of stack "in existence on December 31, 1970," as used in § 123(a), impermissibly extended protection to stacks merely under construction. The court accepted EPA's

view. 719 F.2d at 464-65. At the time, the record before the court indicated that only four to eight plants would be affected by the dispute, and the court mentioned this fact. *Id.* at 465. NRDC now contends that the broader definition will encompass 32-to-98 utility sources, NRDC Brief at 74, and challenges EPA's refusal to reconsider the issue in light of this reassessment of its probable impact.

Although the *Sierra Club* court indisputably mentioned the limited number of plants thought to be affected, its acceptance of EPA's interpretation rested on the view that it was "necessary to make the clause equitable, which was undoubtedly Congress's purpose," 719 F.2d at 465, not on the number of plants affected. We recognize that under the balancing test by which retroactivity is evaluated, frustration of the statutory purpose is a key element militating against non-retroactive application. The new discoveries of affected plants up the ante. But the "in existence" definition did not represent a de novo retroactivity decision by EPA, merely an implementation of Congress's decision. NRDC points us to nothing in the prior rulemaking suggesting that the number of plants affected influenced EPA's choice of the broader definition. *Compare* 46 Fed.Reg. at 49,816/1 (Oct. 7, 1981) (expressing decision to broaden definition without a word as to the number of plants). Accordingly, we are not confronted with a case where "a significant factual predicate of a prior decision" has been removed, which may sometimes trigger a duty to revisit the issue. *See WWHT, Inc. v. FCC*, 656 F.2d 807, 819 (D.C.Cir.1981); *Geller v. FCC*, 610 F.2d 973, 980 n. 59 (D.C.Cir.1979). EPA's adherence to its prior position is lawful. We would be reluctant in any event to start undermining a six-year-old provision governing the scope of Congress's 10-year-old choice to protect decisions actually made more than 17 years ago.

D. *Application of New Demonstration Requirements to Sources that Have Completed Demonstrations*

Industry petitioners urged the agency to exempt from its new demonstration requirements sources that had already made demonstrations supporting above-formula stacks but employing prior more lenient tests. Response to Comments 333-34, J.A. 65-66. The agency refused, explaining that "[t]he fluid modeling demonstration has no significance apart from showing whether the source qualified for credit *under the stack height guidelines then in effect.*" *Id.* at 334, J.A. 66 (emphasis added). Three power companies (Ohio Power, Monongahela Power and Potomac Edison), and an aluminum manufacturer that is a major buyer from Ohio Power, challenge this rejection. These petitioners challenge the validity of the final regulations in *NRDC v. Thomas*, No. 85-1488, and challenge the agency's denial of their petition for reconsideration of these regulations in *Ohio Power v. Thomas*, Nos. 86-1331, 86-1362.

A preliminary issue raised by petitioners is whether this court or the Fourth Circuit properly has jurisdiction over their claims. § 307(b)(1) of the Act provides for review here of "nationally applicable regulations." 42 U.S.C. § 7607(b)(1). It then states that a petition for review of final action which is "locally or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit." *Id.*

Conceivably one might characterize the present grandfathering issue as regional, as its impact evidently falls only on sources in limited geographic areas. Whatever the distribution of affected plants, however, we think the clearly nationwide scope of the regulation is controlling. The section calls for review in local courts of appeals for regulations that are "locally or regionally applicable." If the jurisdictional provision turns on the *de facto* scope of the regulation, choice of the correct forum might

raise complex factual and line-drawing problems. Such a complication of the jurisdictional test would waste time and serve little purpose. *See Sharp v. Weinberger*, 798 F.2d 1521, 1524 (D.C.Cir.1986) (Scalia, J.). We believe the clause governing "nationally applicable regulations" provides jurisdiction over both the direct challenge to the regulations and the petition for reconsideration.

A second preliminary issue is whether the regulations, which say nothing explicit on the subject, actually invalidate the prior approvals. We believe they do. First, nothing in the regulations expresses any affirmative intent to grandfather such sources. The statute precludes emission credit for stack height beyond GEP. The regulations in turn state the rules for determination of GEP. The fact that a source's stack has been found to comply with a former definition of GEP clearly does not suggest that the stack qualifies under the current, more stringent standard. Moreover, the agency has in many places expressly stated its provision of grandfather treatment, discussed in prior parts of this section of this opinion. It has included none in its articulation of criteria for above-formula demonstrations. Finally, EPA in the preamble to the Final Regulations explicitly denied any intention to exempt post-1970 sources from the above-formula demonstration provisions, 50 Fed.Reg. 27,899/1, and in its response to industry comments explicitly denied any intention to grandfather previously approved plants, J.A. 334. Thus, we conclude that the agency has in fact made a final decision not to exempt these sources.

Petitioners make two distinct challenges to the agency's decision. First, they argue that the failure to honor the stack height credit they received pursuant to valid notice and comment proceedings violates the doctrine of "repose." Ohio Power Company Brief at 20-26. The cases cited for the doctrine all involve agencies' attempts to revoke, in adjudicatory proceedings, previously issued licenses, exemptions, or rights-of-way. *See, e.g., Hirschey*

v. FERC, 701 F.2d 215 (D.C.Cir.1983); *Greater Boston Television Corporation v. FCC*, 463 F.2d 268 (D.C.Cir.), *cert. denied*, 406 U.S. 950, 92 S.Ct. 2042, 32 L.Ed.2d 338 (1971); *Chapman v. El Paso Natural Gas Co.*, 204 F.2d 46, 52-54 (D.C.Cir.1953). In *Greater Boston*, the court described the doctrine as binding an agency "to respect the governance of a final administrative decision for the particular matter there determined." *Greater Boston*, 463 F.2d at 291. The doctrine is not an absolute even where clearly applicable. *Id.* (the finality interests embodied in the doctrine of repose are "dominant but not absolute").

Clearly one can make a linguistic argument, as the EPA does, that the matters determined in the earlier demonstrations were only the applicants' entitlements to above-formula credit under the rules then prevailing. This is so, but one could construct similarly narrow definitions of the first decision in each of the above cases. More to the point, it seems that in the context of adjudicatory revocations of adjudicatory grants, special scrutiny is needed to protect legitimate reliance interests from unjustifiable agency shifts in direction.

Here, a new set of duly promulgated rules has substituted more stringent criteria for those prevailing when petitioners made their demonstrations. The risk of capricious agency action is far less severe, as the shift from one set of regulations to another was applicable to a broad range of parties. *Cf. Bi-Metallic Investment Co. v. State Board of Equalization*, 239 U.S. 441, 36 S.Ct. 141, 60 L.Ed. 372 (1915); *Upjohn Co. v. FDA*, 811 F.2d 1583 (D.C.Cir.1987); *American Airlines, Inc. v. CAB*, 359 F.2d 624 (D.C.Cir.), *cert. denied*, 385 U.S. 843, 87 S.Ct. 73, 17 L.Ed.2d 75 (1966). Accordingly, we think the EPA's authority to apply the new criteria to petitioners is not governed by the relatively restrictive bounds of the doctrine of repose, but by the looser ones

already employed in the earlier retroactivity analyses of this section.

Petitioners' second claim is in fact based on the retroactivity criteria set forth in *Sierra Club* and applied in this section of this opinion. They object that the agency failed to spell out any application of those criteria, rendering its decision arbitrary and capricious. Monangahela Power Company Brief at 15-16. The agency's spare disposition of the subject seems to us to fall, barely, on the "tolerably terse" side of the line, as distinct from the "intolerably mute." *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C.Cir.1970), *cert. denied*, 403 U.S. 923, 91 S.Ct. 2229, 29 L.Ed.2d 701 (1971). First, it stressed the importance of the statutory goal. In the preamble to the Final Regulations, it rested its decision to apply the new demonstration requirements to all post-1970 sources on its view that Congress in § 123 did "affirmatively 'intend to alter'" industry reliance upon above-formula height stacks. 50 Fed. Reg. 27,899/1.

On the other side of the retroactivity balance fall the sources' reliance interests. Sources that underwent previous above-formula stack height demonstrations obviously relied on previous EPA guidance in doing so, and the new absolute test, coupled with the NSPS presumption as to emissions, indisputably represents a significant departure from the past requirements. (But EPA noted that regulatory pronouncements since 1970 had consistently placed a higher burden on credits for above-formula stacks. *Id.*) If the new regulations forced the petitioners to renegotiate longterm coal contracts or rendered obsolete major investments in emission control equipment, petitioners might in some circumstances have a strong equitable argument for grandfathering. (Ohio Power makes claims of such commitments; Monangahela, which has not constructed its proposed stack, relies solely on the funds expended in the earlier demonstration itself.) But as the NSPS presumption can be rebutted by

a showing of infeasibility, each source owner will have an opportunity to identify these costs and secure such relief as their size may justify. 50 Fed.Reg. 27,898/2. Thus, the petitioners have not demonstrated that retroactive application of the new demonstration requirement will force them to shoulder a heavy burden.

In fact, the only sunk cost that is directly wasted by the new regulations is the cost of the demonstrations themselves. In the case of one facility that cost was $500,000, in the other $200,000. These figures are hardly negligible, but we should think it a rare case where the costs of securing data could alone entitle a party to grandfathering. We think the agency did not here abuse its discretion.

IV. Plume Rise

Dispersion of pollutants is greater when a lot of exhaust is combined in a single stack rather than ejected through several. Thus one key indicator of dispersive effect is "plume rise," the distance the exhaust is carried above the top of the stack. We deal here with EPA regulation of such stack combinations. The phenomenon occurs both as (1) a stack originally constructed combining exhaust that might have been handled with several stacks and as (2) a stack built to replace several separate stacks.

Section 123(a) bars credit not only for "too tall" stacks but also for "any other dispersion technique." In its 1982 Regulations, EPA expressed a narrow definition of the practices to be denied credit under this language, and expressly excluded several, including "combining the exhause gases from several stacks into one stack." 47 Fed.Reg. 5868/3 (1982). The *Sierra Club* court read EPA's explanation of the definition as in essence a weighing of "the likelihood that [the various practices] would be used as dispersion techniques . . . and the burden, both on enforcement agencies and on industry, of at-

tempting to differentiate legitimate from illegitimate uses." 719 F.2d at 462. The environmental petitioners challenged the definition's exclusion of certain practices, including stack combination. They advocated a definition depending on intent: if a source adopted a practice in order to obtain a less stringent emission level or to avoid imposition of a harsher one, the practice would be regarded as a "dispersion technique." Sierra Club Brief (*Sierra Club* litigation) at 36.

The court agreed with Sierra Club that the agency's conception of "dispersion technique" was unduly restricted, and held that "the words . . . sweep broadly enough to encompass at least the meaning urged by petitioners; the use of devices, alterations to the stack, or other techniques when they are significantly motivated by an intent to gain emissions credit for greater dispersion." *Sierra Club*, 719 F.2d at 462. The court acknowledged the agency's authority to exempt entire categories of practices on either of two grounds—administrative necessity or the *de minimis* character of the effects. But it concluded that the agency had "fall[en] far short" of demonstrating either. *Id.* at 463. In its remand to the agency, however, the court left open the possibility that the agency could "develop classes of plant improvements that are clearly legitimate or clearly illegitimate" so as to "reduce substantially the number of cases in which a full-scale examination of the motivation for the change will be required." *Id.* at 463-64.

The agency responded to the court's remand by amending its definition of "dispersion technique" to include

> any *technique which attempts to affect the concentration of a pollutant* in the ambient air *by* . . . (iii) *Increasing final exhaust gas plume rise by* manipulating source process parameters, exhaust gas parameter, stack parameters, or *combining exhaust gases from several existing stacks into one stack;*

> or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise.

40 C.F.R. § 51.1(hh)(1) (emphasis added). NRDC challenges the agency's new intent-based test, arguing that Congress intended to cover all features having dispersive effects, at least to the extent they may exceed "normal" dispersion. *See* NRDC Brief at 62 n. 121.

NRDC urged this court four years ago to adopt a definition of "dispersion technique" based on a source's motivation. This court accepted NRDC's view. The environmental petitioners could then have made their current argument in favor of an effects test. Since *res judicata* (claim preclusion) bars relitigation not only of matters determined in a previous litigation but also ones that a party could have raised, *Tutt v. Doby*, 459 F.2d 1195, 1197 (D.C.Cir.1972), NRDC is barred. To accept NRDC's invitation to reopen the issue would be to ignore the concern for finality that underlies *res judicata* and create incentives for future strategic gamesmanship. We decline.

Nor does the presence of other parties on the brief open up reconsideration of the matter. 42 U.S.C. § 7607(b)(1)(1982) requires that any petition for review of such regulations as these be filed within 60 days after their appearance in the Federal Register. Contentions in favor of an effects test over one of intent were obviously ripe at the time of initial promulgation in 1982. No party offers the slightest excuse for failure to raise these contentions in the challenges to that set of rules. While we have recently suggested a number of implicit qualifications to apparently iron time limits on challenges to agency rules, *National Labor Relations Board Union v. FLRA*, 834 F.2d 191, 195-197 (D.C.Cir.1987), nothing in that case suggests that a party, fully on notice as to the potential impact of rules upon its interests, is free to sit back while the matter is subject to prolonged

and complex litigation, and then challenge remanded rules on the basis that the court's first ruling did not go far enough. Any such interpretation would make a travesty of Congress's efforts to bring litigation of agency rules to a timely conclusion and to protect the likely reliance of affected parties.

Thus the only issue properly before us is whether the agency properly responded to our remand in *Sierra Club*. It endeavored to do so by creating bright line rules with which to discern whether a source's decision to use a single stack was significantly motivated by a desire to achieve a higher degree of pollution dispersal. These are expressed in the subparts of 40 C.F.R. § 51.1(hh)(2)(ii). Subpart (A) exempts stacks "originally designed and constructed" with combined gas streams, and subpart (B) exempts stack mergers occurring as part of a change in operations comprising an installation of pollution controls and a net reduction in allowable emissions of a pollutant. Subpart (C) provides a laxer test, based on grandfathering precepts, for stack mergers occurring before July 8, 1985 (the date of the rules' appearance in the Federal Register). For them, exemption applies if the merger occurred either as part of a change in operations that included installation of emissions control equipment *or* was carried out for "sound economic or engineering reasons." NRDC objects to each of these classes of exemptions. We address them in turn.

A. *Original Design and Construction as One Stack*

A person with only the notoriously risky "little knowledge" of our air pollution control laws might suppose that the pollution effects of this exclusion must be *de minimis*. After all, we are talking only of post-1970 stacks, and original-design post-1970 stacks should be attached to post-1970 plants, which in turn should be subject to NSPS emissions rates. If SIPs are unlikely to

impose stricter controls than NSPS, then nothing would be at stake.

NRDC asserts, however, that as many as 56 post-1970 plants are not covered by NSPS, and it appears that of these 25 have a combined stack as part of their original design. ICF Inc., Final Analysis of the Proposed Stack Height Regulations, June 1985, Appendix D, *reprinted in* NRDC Brief, Addendum B. EPA appears not to contest the point, and indeed has not invoked the *de minimis* concept to justify its decision. Accordingly, we plunge ahead on the premise that something of moment is at issue.

The agency provides three arguments in support of this exemption. Each of them appears to us, for one reason or another, to misfire. While we do not by any means find that the EPA's conclusion is in violation of statutory authority, we are unable to conclude that it rests upon "reasoned decisionmaking." *See SEC v. Chenery Corp.*, 332 U.S. 194, 196, 67 S.Ct. 1575, 1577, 91 L.Ed. 1995 (1947) ("We may not supply a reasoned basis for the agency's action that the agency itself has not given."); *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 851 (D.C. Cir. 1970), *cert. denied*, 403 U.S. 923, 91 S.Ct. 2229, 29 L.Ed.2d 701 (1971) (the court must intervene if the agency "has not genuinely engaged in reasoned decisionmaking").

First, EPA rests on the text of our opinion in *Sierra Club* and on concepts of ordinary language. It notes that original design characteristics do not *increase* plume rise, so that, it says, they cannot be dispersion techniques. 50 Fed. Reg. at 27,903. It cites *Sierra Club*'s references to dispersion techniques as "alterations to the stack," "changes in stack dimensions," and "improvements" in support of this reading of the statutory language. EPA Brief at 60, citing 719 F.2d at 462-64.

We think the observations of *Sierra Club* on the subject are highly inconclusive. The passages cited by the

EPA appear to have been merely mentioning examples, not attempting an exhaustive list. Elsewhere the court used potentially more inclusive language. *See* 719 F.2d at 462 (noting that the statutory term would reach "the use of devices . . . when they are significantly motivated by an intent to gain emissions credit for greater dispersion").

So far as ordinary language is concerned, clearly nothing inherently prevents the term "dispersion technique" from encompassing a practice adopted during the facility design phase. Moreover, the statute itself does not use the term "increase," with its connotation of change from the levels produced by an existing condition. That term appears only in the *EPA*'s definition of dispersion technique. 40 C.F.R. § 51.1(hh)(1)(iii) ("any technique which attempts to affect the concentration of a pollutant in the ambient air by . . . [i]ncreasing final exhaust gas plume rise by . . . selective handling of exhaust gas streams").

Second, the EPA argues that treatment of original design stacks as dispersion techniques raises insuperable administrative difficulties, namely determining what stack configuration a firm would have adopted in lieu of a unified stack. Indeed, EPA could not necessarily assume that the size of the plant's units would have been the same. *Cf. Sierra Club*, 719 F.2d at 462 (endorsing exemption of a class of practices if the agency could demonstrate that "attainment of the statutory goals is impossible"). As ariculated by EPA, however, these difficulties do not seem enough standing alone. NRDC has suggested one plausible solution, that of using average plume rise as of 1970 as a proxy for normal plume rise. NRDC Brief at 62 n.121. Indeed, the agency's August 1984 draft of the current regulations would have established assumptions as to normal plume rise for source categories through a comparative analysis of stack parameters. Rebuttal Comments 61, J.A. 865. EPA's rejection of both these alternatives is unexplained, leaving

the claim of undue enforcement difficulty inadequately supported.

Finally, the agency asserts that stacks are often merged pursuant to original facility design for legitimate economic or engineering reasons. It points out, for instance, that it is less expensive to build one large stack than three smaller stacks, and also less costly to fit one stack with pollution control equipment than to install such equipment in multiple stacks. 50 Fed. Reg. at 27,903. EPA suggests that because there are legitimate nondispersion-related reasons for merging gas streams, and mergers for the purpose of increasing plume rise are "only a theoretical possibility," its decision to exempt all originally designed merged streams is justified.

The difficulty with this argument is that, given other data in the record, it appears not to satisfy EPA's own test of "intent" to obtain dispersion benefits. NRDC points to evidence indicating that power plants have long realized that merged gas streams can significantly increase plume rise, and that firms have purposefully designed plants to take advantage of this increased dispersion since the early 1960s. A.J. Clarke, "The Application of Air Pollution Research to Power Station Design," *Phil. Transportations* (Roy. Soc. London), Nov. 13, 1969, at 265, 269-72, J.A. 862 n.25. Thus the record, viewing it most favorably to the EPA position, appears to suggest dual purposes, each alone sufficient to explain sources' selection of the single-stack option.

Conceivably EPA might rest on the view that the existence of a sufficient non-dispersion motive exonerates a practice, *i.e.*, establishes its failure to meet the *Sierra Club* intent test. Although the language of *Sierra Club* is ambiguous, and the matter was not at issue, the court appears likely to have contemplated a different view—that the presence of dispersion intent as a sufficient motive, or as a motive crucial (in combination with others) to tilt the decision in favor of a single stack, would render the device a dispersion technique. *See* 719 F.2d at

463 (suggesting that the EPA could not find a lack of dispersion intent for an entire class of techniques unless it could demonstrate that "there is in fact no or little incentive to implement these techniques because the potential reduction in emissions limitations would not be worth the cost"). But in fact the EPA appears to have rejected the narrower test. *See* 50 Fed. Reg. 27,902/3 ("a pure 'but for' test runs the risk of creating exclusions that effectively swallow the rule itself"). Thus, so far as we can grasp it, the EPA believes a source characteristic should be presumed a dispersion technique if dispersion purposes alone provide a sufficient motivation, regardless of the strength of other purposes. If so, EPA's findings of legitimate nondispersionary purposes are not enough, by its standards, to exonerate an original-construction single stack.

To sum up: EPA relies on (1) a notion of "increase" that it never tries to substantiate; (2) administrative difficulties that it asserts without negating the solutions proposed by others and itself; and (3) the existence of a sufficient alternative purpose, which (assuming it is substantiated) is not enough under its own apparent view of the law. The total is three flawed reasons. While in some cases they might form a tenuous sort of tripod, here they seem to us to fail. According to NRDC's undisputed claim this issue accounts for a large fraction of the dispersed emissions at stake. It is fair to demand more, loath as we are to prolong the agony of this process.

Obviously we owe the agency deference if it affords a reasoned explanation, consistent with what Congress has "clearly" required or (in the absence of a clear mandate) with a "reasonable" interpretation of the statute. *Chevron U.S.A. Inc. v. NRDC*, 467 U.S. 837, 842-44, 104 S.Ct. 2778, 2781-83, 81 L.Ed.2d 694 (1984). The present record, however, does not appear to bring us to that point.

B. *General Rule for Merged Stacks*

As noted, this rule exempts stack mergers effected as part of a change in operation that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion only applies to the emission limitation for the pollutant affected by the change in operations. 40 C.F.R. § 51.1(hh)(2)(ii)(B). NRDC argues that this exemption is potentially too lenient by noting the hypothetical possibility that a source could use merger credit for "increment expansion" purposes under the prevention of significant deterioration (PSD) program, 42 U.S.C. § 7470 *et seq.*, thus enabling the source to meet PSD requirements at reduced expense. NRDC does not spell out the objection in any detail. Mere allusion to such a hypothetical is not enough to persuade us that the exemption represents an abuse of the Administrator's discretion.

C. *Partial Grandfathering of Stacks Merged Before July 8, 1985*

Such mergers qualify for exemption if a source can demonstrate that its merger was accomplished as part of a change in operation to install pollution control equipment or for good economic or engineering reasons. 40 C.F.R. § 51.1(ii)(2)(ii)(C). The rule creates a presumption of intent to gain emissions credit in two cases: (1) where there was an increase in the emission limitation after the merger; or (2) where there was no emission limitation in existence before the merging but the quantity of pollutants actually emitted increased in comparison to the pre-merger levels. *Id.*

NRDC attacks EPA's retroactivity analysis, claiming that the agency has not supported its decision to apply a more lenient rule to pre-1985 mergers than to post-1985 mergers. First, it maintains that before 1985 there was no "well established practice" of allowing credit for

dispersion resulting from stack merger. NRDC finds evidence of a more severe approach in EPA's 1976 Guidelines and the 1979 proposed regulations. It substantiates the former solely with one letter from a regional EPA administrator disapproving credit for a particular merger, and the latter with quotation of the proposal's vague language ("other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise"). NRDC Brief at 60, 61 n.119. The agency asserts the existence of a uniformly permissive rule, pointing to three 1980 guidance documents which "uniformly took the view that merging of separate stacks into a single stack 'is generally not considered a dispersion technique' absent other factors." 50 Fed. Reg. 27,903/2. We find the evidence in this regard to be somewhat inconclusive.

Second, NRDC argues that the agency erred in not requiring a demonstration of reliance. The agency responds that it is infeasible to require a demonstration of "actual reliance" when the reliance in question is upon general agency guidance rather than a specific formula or rule. EPA Brief at 66. The point is well taken. Thus, for us, the question comes down to whether the agency's rule for pre-1985 sources is sufficiently protective of the statutory purpose.

NRDC asserts that the regulations provide large loopholes for mergers that were significantly motivated by an intent to gain increased dispersion credit. As to mergers accompanying installation of pollution control equipment, it suggests that a source might intentionally install equipment for one pollutant in order to secure the right to increase emissions of another. On the facts, this seems most improbable. The rule applies only to pre-1985 mergers, and we doubt many source owners had the foresight to anticipate EPA's exemption and slip through its supposed loophole before its promulgation. Further protection is added by EPA's presumption of a significant dispersion motive where the merger was accompa-

nied by a relaxation of emissions limits or an increase in emissions.

As to the exemption for mergers made for "sound economic or engineering reasons," NRDC objects not on the basis of that language itself but by reference to language in a "Guidance" document later published by EPA, "Implementation of Stack Height Regulations—Exceptions From Restrictions on Credit for Merged Stacks" at 3 (October 28, 1985). In a separate suit brought by NRDC before this court we declined substantive review of that document on the ground that the guidelines "represent tentative agency positions that may be modified in subsequent agency proceedings," and "do not represent final agency action subject to judicial review under 42 U.S.C. § 7607(b) (1982)." *NRDC v. Thomas*, No. 85-1488 and consolidated cases (D.C. Cir. Aug. 3, 1986). NRDC has brought nothing to our attention that would increase their finality.

Acordingly, the substantive review now appropriate reveals no illegality in EPA's rules for pre-1985 stack mergers.

V. Miscellany

A. *Multi-Point Rollback*

NRDC argued in a footnote in its opening brief that a system of calculating emissions limitations known as multi-point rollback ("MPR") is a form of intermittent control system ("ICS"), and is therefore unlawful under the statute. § 123(b) states that dispersion techniques include "any intermittent . . . control of air pollutants varying with atmospheric conditions."

MPR in fact involves calculating emission limits in light of the fact that a certain proportion of days will involve relatively high dispersion; it allows the source to emit more on an *equivalent proportion* of days. But the days of higher emission need not correspond with the actual days of higher dispersion. We think that under

Chevron U.S.A. Inc. v. NRDC, 467 U.S. 837, 104 S.Ct. 2778, 81 L.Ed.2d 694 (1984), EPA was entitled to read the statutory language as referring only to control systems that varied output with the time of actual weather changes. We join the Ninth Circuit in upholding the agency's reading. *See Kamp v. Hernandez*, 752 F.2d 1444, 1451-52 (9th Cir.1985).

B. *Definition of "Nearby" as Used in Demonstrations*

Section 123(c) defines GEP stack height as that height necessary to insure that emissions from the stack will not cause excessive pollution concentrations as a result of downwash created by "the source itself, *nearby* structures or *nearby* terrain obstacles." 42 U.S.C. § 7423(c) (emphasis added.) In its 1982 Regulations, the agency's articulation of its formula considered structures only if located within one-half mile of the source. Its provision for demonstrations provided no similar limit on the structures or terrain features to be taken into account. In *Sierra Club*, this court upheld the one-half mile definition of "nearby" used in the formula as consistent with the statute and legislative history, 719 F.2d at 444, but criticized the agency for not applying the same restriction in its rules for demonstrations. The court remanded for EPA to "include new regulations that apply the same 'nearby' limitation to demonstrations as is applied to the formulas." *Id.* at 445-46. The agency proceeded to do so. 40 C.F.R. § 51.1(jj)(2).

Industry petitioners, noting an EPA statement that the *Sierra Club* "court required EPA to apply the half-mile limit to the definition of 'nearby' in fluid-modeling demonstrations," J.A. 286, argues that EPA erroneously supposed that *Sierra Club* bound it to the half-mile figure and therefore failed to exercise its discretion to determine whether a different definition might be more appropriate for demonstrations. Alabama Power Brief at 40-42. *See*

Phillips Petroleum Co. v. FERC, 792 F.2d 1165, 1169 (D.C.Cir.1986) ("deference . . . is only appropriate when the agency has exercised its *own* judgment. When, instead, the agency's decision is based on an erroneous view of the law, its decision cannot stand") (emphasis in original).

We agree with the petitioners that this court did not mandate a one-half mile restriction for demonstrations. Rather, it held that the one-half mile restriction was a reasonable exercise of the Administrator's statutory discretion as applied to the formula, and also that the Administrator must apply in demonstrations the same numerical limit as it uses in application of its formula. If we thought that the agency had misread *Sierra Club* to preclude its choice of some other numerical limit, we would remand the issue for further consideration.

In fact, however, we do not read the quoted language as indicating such a mistake. So far as appears no petitioner asked the agency to reconsider the half-mile figure for formulas. Accordingly, when the agency spoke of the compulsion of *Sierra Club*, we think it meant only that, there being no further debate on use of the half-mile figure for the formula, *Sierra Club* required it to employ that figure for demonstrations.

C. *Modeling Adjustments for Complex Terrain*

"Plume impaction" occurs when a stream of exhaust gases hits a higher hill or mountain downwind before dispersion, causing high concentrations on the mountainside. 719 F.2d at 452. To take account of this phenomeon, the agency gave credit in its 1982 Final Regulations "for the amount of its stack necessary to ensure that violations [would] not occur on the mountain as a result of the amount of the mountain's height that is above GEP height." *Id.* This court found "much to commend EPA's

action from a policy perspective," but concluded that § 123 did not permit such an adjustment. *Id* at 455. The court therefore reversed the agency's "attempt to reduce emissions limitations by [credit for] so much of the stack height as needed to avoid plume impaction." *Id.* at 456.

Pursuant to this court's holding on the matter, the agency included no provision for plume impaction credit in its 1985 regulations. Industry petitioners recognize that the agency is precluded from reintroducing plume impaction credits. Alabama Power Brief at 45. However, they maintain that unless the agency adjusts its complex terrain screening models to account for the existence of plume impaction, sources will be treated as if they were violating NAAQS in mountainous terrain when in fact they have avoided such violations by building appropriately tall stacks. *Id.* at 45-47. They therefore urged the agency during the rulemaking to make "adjustments to its overpredictive complex terrain screening models." *Id.* at 45; *see also* J.A. 557-81.

EPA rejected the proposal because it found that

> "[m]anipulation . . . of modeling parameters to avoid predicting theoretical plume impaction where actual stacks have been constructed above GEP would be tantamount to granting the same impaction credit that was invalidated by the [*Sierra Club*] court." 50 Fed.Reg. 27,904/2.

The actual meaning of EPA's remark is not fully clear to us. In a currently ongoing rulemaking EPA is revising its "Guideline on Air Quality Models" and is evaluating the merits of the "Rough Terrain Display Model" advocated by industry. 50 Fed.Reg. at 27,904/2. The outcome of this rulemaking will presumably delineate what the agency believes is permissible and what is not. There being no final decision on the subject, we may not intervene.

CONCLUSION

We uphold the agency except as to its grandfathering of pre-October 1, 1983 stack increases from demonstration requirements (part III.A), grandfathering of pre-January 12, 1979 original height stacks up to H + 1.5L (part III.B.2), and exemption of original construction single stacks from its "dispersion technique" definition (part IV.A). These we remand to the agency for proceedings consistent with this opinion.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 85-1488

NATURAL RESOURCES DEFENSE COUNCIL, INC. *et al.*

v.

LEE M. THOMAS, Administrator
U.S. Environmental Protection Agency
and consolidated cases

No. 86-1331, et al.

OHIO POWER COMPANY, *et al.*

v.

LEE THOMAS, *et al.*
and consolidated cases

[Filed Apr. 13, 1988]

Before: RUTH B. GINSBURG and WILLIAMS, Circuit Judges; AUBREY ROBINSON, Chief Judge, U.S. District Court of the District of Columbia

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ORDER

Upon consideration of the petitions for rehearing of Respondents, of the Natural Resources Defense Council Inc, et al., and of the State of Ohio, et al., it is

ORDERED, by the Court, that the aforesaid petitions are denied.

FOR THE COURT:

CONSTANCE L. DUPRE
Clerk

By: /s/ Robert A. Bonner
ROBERT A. BONNER
Deputy Clerk

UNITED STATES COURT OF APPEALS
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OHIO POWER COMPANY, *et al.*

v.

LEE THOMAS, *et al.*
and consolidated cases

[Filed Apr. 13, 1988]

Before: WALD, Chief Judge; ROBINSON, MIKVA, EDWARDS, RUTH B. GINSBURG, STARR, SILBERMAN, BUCKLEY, WILLIAMS, D. H. GINSBURG and SENTELLE, Circuit Judges; AUBREY ROBINSON, Chief Judge, U.S. District Court for the District of Columbia

ORDER

The sugestions for rehearing *en banc* of the United Mine Workers of America, et al., Ohio Power Company and Ormet Corporation and of the State of Ohio, et al., have been circulated to the full court. No member of the court requested the taking of a vote thereon. Upon consideration of the foregoing it is

ORDERED, by the Court *en banc*, that the aforesaid suggestions are denied.

FOR THE COURT:

CONSTANCE L. DUPRE
Clerk

By: /s/ Robert A. Bonner
ROBERT A. BONNER
Deputy Clerk

Circuit Judge Silberman did not participate in this Order.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 85-1488

NATURAL RESOURCES DEFENSE COUNCIL, INC. *et al.*
Petitioners

v.

LEE M. THOMAS, Administrator
U.S. Environmental Protection Agency
Respondent

and consolidated Cases Nos. 85-1489, 85-1543, 85-1552, 85-1554, 85-1556, 85-1557, 85-1558, 85-1560, 85-1568

[Filed May 5, 1988]

Before: RUTH B. GINSBURG and WILLIAMS, Circuit Judges, and AUBREY ROBINSON, Chief Judge, United States District Court for the District of Columbia

ORDER

Upon consideration of the Motion of Respondent—Intervenors Alabama Power Company, et al. for Stay of Issuance of Mandate, the Opposition thereto, and of the reply, it is

ORDERED, by the Court, that the Clerk is directed to withhold issuance of the Court's mandate for a period of 30 days from the date of this order.

FOR THE COURT:

CONSTANCE L. DUPRE
Clerk

By: /s/ Robert A. Bonner
ROBERT A. BONNER
Deputy Clerk

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[AD-FRL-2847-6]

Stock Height Regulation

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rulemaking.

SUMMARY: Section 123 of the Clean Air Act, as amended, requires EPA to promulgate regulations to ensure that the degree of emission limitation required for the control of any air pollutant under an applicable State implementation plan (SIP) is not affected by that portion of any stack height which exceeds good engineering practice (GEP) or by any other dispersion technique. A regulation implementing section 123 was promulgated on February 8, 1982, at 47 FR 5864. Revisions to the regulation were proposed on November 9, 1984, at 49 FR 44878. Today's action incorporates changes to the proposal and adopts this regulation in final form.

EFFECTIVE DATE: This regulation becomes effective on August 7, 1985.

FOR FURTHER INFORMATION CONTACT: Eric O. Ginsburg, MD-15, Office of Air Quality Planning and Standards, EPA, Research Triangle Park, North Carolina 27711. Telephone (919) 541-5540.

SUPPLEMENTARY INORMATION:

Docket Statement

Pertinent information concerning this regulation is included in Docket Number A-83-49. The docket is open for

public inspection between the hours of 8:00 a.m. and 4:00 p.m., Monday through Friday, at the EPA Central Docket Section, West Tower Lobby, Gallery One, 401 M Street, SW., Washington, D.C. Background documents normally available to the public, such as Federal Register notices and Congressional reports, are not included in the docket. A reasonable fee may be charged for copying documents.

Background

Statute

Section 123, which was added to the Clean Air Act by the 1977 Amendments, regulates the manner in which techniques for disperson of pollutants from a source may be considered in setting emission limitations. Specifically, section 123 requires that the degree of emission limitation shall not be affected by that portion of a stack which exceeds GEP or by "any other dispersion technique." It defines GEP, with respect to stack heights as:

the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles . . . [Section 123(c)].

Section 123 further provides that GEP stack height shall not exceed two and one-half times the height of the source (2.5H) unless a demonstration is performed showing that a higher stack is needed to avoid "excessive concentrations." As the legislative history of section 123 makes clear, this reference to a two and one-half times test reflects the established practice of using a formula for determining the GEP stack height needed to avoid excessive downwash. Finally, section 123 provides that the Administrator shall regulate only stack height credits—that is,

the portion of the stack height used in calculating an emission limitation—rather than actual stack heights.

With respect to "other dispersion techniques" for which emission limitation credit is restricted, the statute is less specific. It states only that the term shall include intermittent and supplemental control systems (ICS, SCS), but otherwise leaves the definition of that term to the discretion of the Administrator.

Thus the statute delegates to the Administrator the responsibility for defining key phrases, including "excessive concentrations" and "nearby," with respect to both structures and terrain obstacles, and "other dispersion techniques." The Administrator must also define the requirements of an adequate demonstration justifying stack height credits in excess of the 2.5H formula.

Rulemaking and Litigation

On February 8, 1982 (47 FR 5864), EPA promulgated final regulations limiting stack height credits and other dispersion techniques. Information concerning the development of the regulation was included in Docket Number A-79-01 and is available for inspection at the EPA Central Docket Section. This regulation was challenged in the U.S. Court of Appeals for the D.C. Circuit by the Sierra Club Legal Defense Fund, Inc.; the Natural Resources Defense Council, Inc.; and the Commonwealth of Pennsylvania in *Sierra Club* v. *EPA*, 719 F.2d 436. On October 11, 1983, the court issued its decision ordering EPA to reconsider portions of the stack height regulation, reversing certain portions and upholding other portions. Further discussion of the court decision is provided later in this notice.

Administrative Proceedings Subsequent to the Court Decision

On December 19, 1983, EPA held a public meeting to take comments to assist the Agency in implementing the

mandate of the court. This meeting was announced in the Federal Register on December 8, 1983, at 48 FR 54999. Comments received by EPA are included in Docket Number A-83-49. On February 28, 1984, the electric power industry filed a petition for a writ of certiorari with the U.S. Supreme Court. While the petition was pending before the court, the mandate from the U.S. Court of Appeals was stayed. On July 2, 1984, the Supreme Court denied the petition (104 S.Ct. 3571), and on July 18, 1984, the Court of Appeals mandate was formally issued, implementing the court's decision and requiring EPA to promulgate revisions to the stack height regulations within 6 months. The promulgation deadline was ultimately extended to June 27, 1985, in order to provide additional opportunities for public comment, to allow EPA to hold a public hearing on January 8, 1985, and to provide additional time for EPA to complete its analysis of rulemaking alternatives.

Documents

In conjunction with the 1982 regulation and this revision, EPA developed several technical and guidance documents. These served as background information for the regulation, and are included in Dockets A-79-01 and A-83-49. The following documents have been or will be placed in the National Technical Information Service (NTIS) system and may be obtained by contacting NTIS at 5285 Port Royal Road, Springfield, Virginia 22161.

(1) "Guideline for Use of Fluid Modeling to Determine Good Engineering Stack Height," July 1981. EPA, Office of Air Quality Planning and Standards, EPA-450/4-81-003 (NTIS PB82 145327).

(2) "Guideline for Fluid Modeling of Atmospheric Diffusion," April 1981. EPA, Environmental Sciences Research Laboratory, EPA-600/8-81-009 (NTIS PB81 201410).

(3) "Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulation)," June 1985. EPA, Office of Air Quality Planning and Standards, EPA-450/4-80-023R.

(4) "Determination of Good Engineering Practice Stack Height—A Fluid Model Demonstration Study for a Power Plant," April 1983, EPA. Environmental Sciences Research Laboratory, EPA-600/3-83-024 (NTIS PB83 207407).

(5) "Fluid Modeling Demonstration of Good-Engineering Practice Stack Height in Complex Terrain," April 1985, EPA Atmospheric Sciences Research Laboratory, EPA 600/3-85/022 (NTIS PB85 203107).

In addition, the following documents are available in Docket A-83-49.

"Economic Impact Assessment for Revisions to the EPA Stack Height Regulations," June 1985.

"Effect of Terrain-Induced Downwash on Determinations of Good-Engineering-Practice Stack Height," July 1984.

Program Overview

General

The problem of air pollution can be approached in either of two ways: through reliance on a technology-based program that mandates specific control requirements (either control equipment or control efficiencies) irrespective of ambient pollutant concentrations, or through an air quality based system that relies on ambient air quality levels to determine the allowable rates of emissions. The Clean Air Act incorporates both approaches, but the SIP program under section 110 uses an air quality-based approach to establish emission limitations for sources. Implicitly, this approach acknowledges

and is based on the normal dispersion of pollutants from their points of origin into the atmosphere prior to measurements of ambient concentrations at ground level.

There are two general methods for preventing violations of the national ambient air quality standards (NAAQS) and prevention of significant deterioration (PSD) increments. Continuous emission controls reduce on a continuous basis the quantity, rate, or concentrations of pollutants released into the atmosphere from a source. In contrast, dispersion techniques rely on the dispersive effects of the atmosphere to carry pollutant emissions away from the source in order to prevent high concentrations of pollutants near the source. Section 123 of the Clean Air Act limits the use of dispersion techniques by pollution sources to meet the NAAQS or PSD increments.

Tall stacks, manipulation of exhaust gas parameters, and varying the rate of emissions based on atmospheric conditions (ICS and SCS) are the basic types of dispersion techniques. Tall stacks enhance dispersion by releasing pollutants into the air at elevations high above ground level, thereby providing greater mixing of pollutants into the atmosphere. The result is to dilute the pollutant levels and reduce the concentrations of the pollutant at ground level, without reducing the total amount of pollution released. Manipulation of exhaust gas parameters increases the plume rise from the source to achieve similar results. ICS and SCS vary a source's rate of emissions to take advantage of meteorologic conditions. When conditions favor rapid dispersion, the source emits pollutants at higher rates, and when conditions are adverse, emission rates are reduced. Use of dispersion techniques in lieu of constant emission controls results in additional atmospheric loadings of pollutants and can increase the possibility that pollution will travel long distances before reaching the ground.

Although overreliance on dispersion techniques may produce adverse effects, some use of the dispersive properties of the atmosphere has long been an important factor in air pollution control. For example, some stack height is needed to prevent excessive pollutant concentrations near a source. When wind meets an obstacle such as a hill or a building, a turbulent region of downpath, wakes, and eddies is created downwind of the obstacle as the wind passes over and around it. This can force a plume rapidly to the ground, resulting in excessive concentrations of pollutants near the source. As discussed previously, section 123 recognizes these phenomena and responds by allowing calculation of emission limitations with explicit consideration of that portion of a source's stack that is needed to ensure that excessive concentrations due to downwash will not be created near the source. This height is called GEP stack height.

Summary of the Court Decision

Petitions for review of EPA's 1982 regulation were filed in the D.C. Circuit within the statutory time period following promulgation of the regulation. On October 11, 1983, the court issued its decision ordering EPA to reconsider portions of the stack height regulation, reversing certain portions and upholding others. The following is a summary of the court decision.

The EPA's 1982 rule provided three ways to determine GEP stack height. One way was to calculate the height by using a formula based on the dimensions of nearby structures. The other two were a *de minimis* height of 65 meters, and the height determined by a fluid modeling demonstration or field study. The court endorsed the formula as a starting point to determine GEP height. However, it held that EPA has not demonstrated that the formula was an accurate predictor of the stack height needed to avoid "excessive concentrations of pollutants due to downwash. Accordingly, the court directed EPA

to re-examine in three ways the conditions under which exceptions to the general rule of formula reliance could be justified.

First, the 1982 rule allowed a source to justify raising its stack above formula height by showing a 40-percent increase in concentrations due to downwash, wakes, or eddies, on the ground that this was the percentage increase that the formula avoided. The court found this justification insufficient, and remanded the definition to EPA with instructions to make it directly responsive to health and welfare considerations.

Similarly, the 1982 rule allowed a source that built a stack to less than formula height to raise it to formula height automatically. Once again, the court required more justification that such a step was needed to avoid adverse health or welfare effects.

Finally, the court directed EPA either to allow the authorities administering the stack height regulations to require modeling by sources in other cases as a check on possible error in the formula, or explain why the accuracy of the formula made such a step unnecessary.

The 1982 rule provided two formulae to calculate GEP stack height. For sources constructed on or before January 12, 1979, the date of initial proposal of the stack height regulations, the applicable formula was 2.5 times the height of the source or other nearby structure. For sources constructed after that date, the rule specified a newer, refined formula, the height of the source or other nearby structure plus 1.5 times the height or width of that structure, whichever is less ($H+1.5L$) . The EPA based its decision to include two formulae on the unfairness of applying the new formula retroactively. In its examination of this issue, the court specified four factors that influence whether an agency has a duty to apply a rule retroactively. They are:

1. Whether the new rule represents an abrupt departure from well established practice or merely attempts to fill a void in an unsettled area of law,

2. The extent to which the party against whom the new rule is applied relied on the former rule.

3. The degree of burden which a retroactive order imposes on a party, and

4. The statutory interest in applying a new rule despite the reliance of a party on the old standard.

719 F.2d at 467 (citations omitted). Applying this analysis to the two formulae, the court upheld EPA's basic decision.

However, the court also held that sources constructed on or before January 12, 1979, should not be automatically entitled to full credit calculated under the 2.5H formula unless they could demonstrate reliance on that formula. The court remanded this provision for revision to take actual reliance on the 2.5H formula into account.

The statute limits stack height credit to that needed to avoid excessive concentrations due to downwash caused by "nearby" structures or terrain features. The 1982 regulation defined "nearby" for GEP formula applications as five times the lesser of either the height or projected width of the structure causing downwash, not to exceed one-half mile. No such distance limitation was placed on structures or terrain features whose effects were being considered in fluid modeling demonstrations or field studies. The court held that section 123 explicitly applies the "nearby" limitation to demonstrations and studies as well as formula applications, and remanded the rule to EPA to apply the limitation in both contexts.

The 1982 rule defined "dispersion techniques" as those techniques which attempt to affect pollutant concentrations by using that portion of a stack exceeding GEP, by

varying emission rates according to atmospheric conditions or pollutant concentrations, or by the addition of a fan or reheater to obtain a less stringent emission limitation. The court found this definition too narrow because any technique "significantly motivated by an intent to gain emissions credit for greater dispersion" should be barred. 719 F.2d 462. As a result, the court directed EPA to develop rules disallowing credit for all such dispersion techniques unless the Agency adequately justified exceptions on the basis of administrative necessity or a *de minimis* result.

The GEP formulae established in the 1982 rule do not consider plume rise, on the ground that plume rise is not significant under downwash conditions. In its review of this provision, the court affirmed this judgment by EPA.

The 1982 rule addressed pollutant concentrations estimated to occur when a plume impacts elevated terrain by allowing credit for stack height necessary to avoid air quality violations in such cases. However, the court ruled that section 123 did not allow EPA to grant credit for plume impaction in setting emission limits, and reversed this part of the regulation.

The preamble to the 1982 regulation provided a 22 month process for State implementation of the regulation. The court found this period to be contrary to section 406(d)(2) of the Clean Air Act and reversed it.

The regulation, following the statute, excluded stacks "in existence" on or before December 31, 1970, from the GEP requirements. However, the regulation did not prohibit sources constructed after December 31, 1970, from receiving credit for tying into pre-1971 stacks. Although the court upheld EPA's definition of "in existence," it noted that EPA had failed to address the tie-in issue. Accordingly, the court remanded this issue to EPA for justification.

One other provision of the regulation was challenged in the *Sierra Club* suit: The exclusion of flares from the definition of "stack." In its review of this provision, the court held that EPA had acted properly.

Other provisions of the stack height regulations, such as the *de minimis* stack height established under § 51.1 (ii) (1), were not challenged in the suit and thus remain in effect.

Summary of the November 9, 1984, Notice of Proposed Rulemaking

In the November 9, 1984, notice responding to the court decision, EPA proposed to redefine the number of specific terms, including "excessive concentrations," "dispersion techniques," "nearby," and other important concepts, and proposed to modify some of the bases for determining GEP stack height. The following is a summary of the revisions that were proposed.

Excessive Concentrations

The Court of Appeals held that EPA erred in defining "excessive concentrations" due to downwash, for purposes of justifying a stack greater than formula height, as nothing more than a 40-percent increase in pollutant concentrations over what would occur in the absence of downwash. It remanded this issue to EPA to relate the definition to some absolute level of air pollution that could be interpreted to endanger health and welfare, and thus to be "excessive."

The EPA proposed two alternative approaches to defining "excessive concentrations." First, EPA requested comment on whether the 40-percent approach adopted as part of the 1982 regulation in fact protects against the dangers to health and welfare envisioned by Congress when it enacted section 123. In the event that such a showing could not be made, EPA proposed a two-part

definition of excessive concentrations, requiring that the downwash, wakes, or eddies induced by nearby structures or terrain features result in increases in ground-level pollutant concentrations that:

(a) Cause or contribute to an exceedance of a NAAQS or applicable PSD increment, and

(b) Are at least 40 percent in excess of concentrations projected to occur in the absence of such structures or terrain features.

Definition of GEP Stack Height

EPA proposed to find that the traditional (2.5H) and refined (H+1.5L) formulae remained proper methods for calculating GEP stack height except EPA proposed to revise its regulation to allow EPA, the State or local air pollution control agency discretion to require a further demonstration using a field study or fluid model to demonstrate GEP stack height for a source in a case where it was believed that the formula may not reliably predict GEP height. In the case of structures that are porous or aerodynamically smoother than block-shaped structures, it would require a source to demonstrate the downwash effects of such structures using a field study or fluid model before receiving credit for stack height based on the structures. EPA also proposed generally to allow sources to raise existing stacks up to formula GEP height without further demonstrations with the exception noted above for discretionary modeling.

Reliance on the 2.5H Formula

In its 1982 rules, EPA allowed sources built before January 12, 1979, the date on which it proposed the refined H+1.5L formulae, to calculate their emission limits based on the traditional 2.5H formula that existed previously. The court approved this distinction, but ruled that it should be limited to sources that "relied"

on the traditional formula, suggesting, for example, that sources that had claimed credit for stacks far taller than the formula provided could not be said to have "relied" on it.

In response to the court decision, EPA proposed to revise its regulation to require that for stacks in existence on January 12, 1979, sources demonstrate that they actually relied on the 2.5H formula in the design of their stacks before receiving credit for that height in setting their emission limitations. In the proposal, EPA requested comments on what it should consider as acceptable evidence of such reliance.

Definition of "Nearby"

In its 1982 rules, EPA allowed sources that modeled the effects of terrain obstacles on downwash to include any terrain features in their model without limiting their distance from the stack. The court, though persuaded that this was a sensible approach, since it allowed the model to best approximate reality, ruled that Congress had intended a different result, namely that terrain features beyond ½ mile from the stack should not be included in the model.

In response, EPA proposed to revise § 51.1(ii)(3) of its regulation to limit the consideration of downwash, wakes, and eddy effects of structures and terrain features to those features classified as being "nearby" as defined in § 51.1(ii). Under this proposal, structures and terrain features would be considered to be "nearby" if they occur within a distance of not more than 0.8 km (½ mile); terrain features that extend beyond 0.8 km could be considered if, at a distance of 0.8 km, they achieved a height greater than or equal to 40-percent of the GEP stack height calculated by applying the GEP formula to actual nearby structures. In other words, a terrain feature would be said to "begin" within ½ mile if it reached

at least the height of nearby buildings within that distance. Such features could be considered only out to a distance equal to 10 times the maximum height of the feature, not to exceed 2 miles.

The EPA proposed two options for distinguishing between sources constructed before and after the date of promulgation of these revisions. The first option would treat both categories of sources the same. The second option would limit the consideration of terrain for new sources to only those portions of terrain features that fall *entirely* within 0.8 km, thereby removing the possibility of including features extending beyond ½ mile.

Finally, EPA proposed three alternatives for conducting fluid modeling to evaluate the downwash effects or nearby terrain features. These alternatives described various ways of limiting terrain in the model beyond the proposed distance limitations.

To establish a baseline for comparison, two alternatives would initially model the stack on a flat plane with no structure or terrain influences. To analyze downwash effects, the first approach would then insert nearby terrain, with all terrain beyond the distance limit "cut off" horizontally. The second approach would gradually smooth and slope the terrain beyond the distance limit, down to the elevation of the base of the stack.

The third approach would proceed in a somewhat different manner. A baseline would be established by modeling all terrain beyond the distance limit, smoothing and sloping nearby terrain to minimize its influence. To analyze downwash effects, the nearby terrain would then be inserted into the model and the difference in effect measured to determine appropriate downwash credit for stack height.

Definition of "Dispersion Techniques"

In the 1982 rules, EPA identified two practices, in addition to stacks above GEP and ICS/SCS, as having no

purpose other than to obtain a less stringent emission limitation. In so doing, it allowed credit for any other practice that had the result of increasing dispersion. The court concluded that Congress had intended, at a minimum, to forbid any dispersion enhancement practice that was significantly motivated by an intent to obtain additional credit for greater dispersion, and remanded the question to EPA for reexamination.

The EPA proposed to revise its definition of "dispersion techniques" generally to include, in addition to ICS, SCS, and stack heights in excess of GEP, any techniques that have the effect of enhancing exhaust gas plume rise. Combining several existing stacks into one new stack can have such an effect. However, such combinations also often have independent economic and engineering justification. Accordingly, EPA requested comment on defining the circumstances under which the combining of gas streams should not be considered a dispersion technique, and proposed to allow sources to take credit in emission limitations for such merging where a facility was originally designed and constructed with merged gas streams or where the merging occurs with the installation of additional controls yielding a net reduction in total emissions of the affected pollutant. The EPA retained exclusions from its definition of prohibited dispersion techniques for smoke management in agricultural and silvicultural prescribed burning programs and also proposed to exclude episodic restrictions on residential woodburning and debris burning.

New Sources Tied into Pre-1971 Stacks

Section 123 exempts stacks "in existence" at the end of 1970 from its requirements. EPA's general approach to implementing this language was upheld by the court. However, in its 1982 rule EPA had also allowed this credit to sources built after that date that had tied into stacks built before that date. EPA failed to respond to

comments objecting to this allowance, and so the court remanded the question to EPA for the agency to address.

Upon reexamination, EPA saw no convincing justification for granting credit to these sources. Consequently, for sources constructed after December 31, 1970, with emissions ducted into grandfathered stacks of greater than GEP height and for sources constructed before that date but for which major modifications or reconstruction have been carried out subsequently, EPA proposed to limit stack height credit to only so much of the actual stack height as conforms to GEP. Sources constructed prior to December 31, 1970, for which modifications are carried out that are not classified as "major" under 40 CFR 51.18(j)(i), 51.24(6)(2)(i), and 51.21(6)(2)(i) would be allowed to retain full credit for their existing stack heights.

Plume Impaction

In its 1982 rules, EPA allowed stack height credit for "plume impaction," a phenomenon that is distinct from downwash, wakes and eddies. The court, though sympathetic to EPA's policy position, reversed this judgment as beyond the scope of the statute. Accordingly, EPA proposed to delete the allowance of plume impaction credit from its regulation in compliance with the court decision. However, EPA also recognized that sources in complex terrain face additional analytical difficulties when attempting to conduct modeling to determine appropriate emission limitations. Consequently, EPA requested comment on whether any allowance should be made for implementation problems that may result from the application of revised GEP stack height assumptions and, if so, how such allowance should be made.

State Implementation Plan Requirements

EPA's 1982 rules gave states a total of 22 months to revise their rules and to establish source emission limi-

tations based on new stack height credits. The court found this, too, to go beyond the language of the statute. In response, EPA stated in the proposal that States would be required, pursuant to section 406(d)(2)(b) of the Clean Air Act, to review their rules and existing emission limitations, revising them as needed to comply with the new regulation within 9 months of the date of its promulgation.

Response to Public Comments on the November 9, 1984, Proposal

The EPA received over 400 comments during the public comment period and at the public hearing, addressing a number of aspects of the proposed regulation. These comments have been consolidated according to the issues raised and are discussed, along with EPA's responses, in a "Response to Comments" document included in the rulemaking docket. Certain comments can be characterized as "major" in that they address issues that are fundamental to the development of the final regulation. These comments are summarized below, along with EPA's responses. Additional discussion of the issues raised and further responses by EPA can be found in the "Response to Comments" document.

I. Maximum Control of Emissions in Lieu of Dispersion

A central legal and policy question addressed in this rulemaking was raised in the comments of the Natural Resources Defense Council (NRDC) and the Sierra Club. They contend that section 123 requires all sources to install the maximum feasible control technology before receiving any credit for the dispersive effects of a stack of any height, or for other practices that may enhance pollutant dispersion.

The NRDC argument is summarized fully in the Response to Comments document together with EPA's re-

sponse. Very briefly, NRDC contends that litigation prior to the 1977 Clean Air Act Amendments had established that dispersion can never be used as an alternative to emission control, and that this understanding was carried forward and strengthened in the 1977 Clean Air Act Amendments. Accordingly, no rule that does not require full control of emissions as a prerequisite to any stack height credit would be consistent with Congressional intent.

EPA disagrees. During the 8 years between 1977 and NRDC's comments, a period covering two Administrations and three Administrators, NRDC's position has never been either adopted by EPA or seriously advocated before it. The pre-1977 cases cited by NRDC do not bar all stack credit, but only credit for stacks beyond the historical norm. Finally, the text and legislative history of section 123 contain essentially no support for NRDC's "control first" position.

II. Discussion of Other Major Issues

The EPA's position on the "control first" comments provides the necessary background against which the remaining major issues in this rulemaking are discussed. These issues are: the definition of "excessive concentrations" due to downwash, wakes, and eddies; the definition of "nearby;" and the definition of "dispersion technique." A question that affects several of these decisions and that is addressed where it arises, concerns the extent to which any changes made in the stack heights regulations should be applied prospectively rather than retroactively.

This discussion of "excessive concentrations" is in turn divided into a discussion of the physical characteristics of downwash, followed by a discussion of the significance of those characteristics as they pertain to the GEP formulae, to stacks above formula height, to stacks being

raised to formula height, and to stacks at formula height being modeled at the choice of the administering authorities.

Definition of "Excessive Concentrations"

The Physical Nature of Downwash. A number of commenters, including the Utility Air Regulatory Group (UARG), have argued that the court decision does not obligate EPA to revise the definition adopted in the 1982 regulation, but only directs EPA to ensure that the 40-percent criterion protects against concentrations due to downwash that could be related to health and welfare concerns. They point out that when emissions from a source become trapped in the wake region produced by the source itself or upwind structures and terrain features, those emissions are brought rapidly to earth, with little dilution. This, the commenters argue, can produce short-term peak concentrations at groundlevel that are many times greater than the concentration levels of the NAAQS. Because their duration is relatively short, averaging these concentrations over the times specified by the NAAQS does not result in NAAQS violations. Nonetheless, the commenters argue that these concentrations should be regarded as nuisances that section 123 was specifically enacted to avoid. Accordingly, the commenters held that EPA would be justified in retaining the 40-percent criterion without requiring that such increases result in exceedances of the NAAQS.

These same commenters argued that severe hardships would result if EPA's second proposed definition of "excessive concentrations" is adopted, and that, by limiting stack height credit to that just necessary to avoid exceedance of NAAQS or PSD increments, the definition would act to limit actual stack design and construction in a way that would increase the likelihood of NAAQS or PSD exceedances. This would occur, they argue, be-

cause, by building only so tall a stack as they can receive credit for, sources would be eliminating a "margin of safety" that would normally be provided otherwise. Furthermore, it was argued that, due to the changing nature of background air quality, inclusion of absolute concentrations such as the NAAQS or PSD increments in the definition would render determinations of GEP stack height constantly subject to change.

NRDC argued on the other hand that only a violation of air quality standards can be considered the type of "excessive concentration" for which downwash credit can be justified, the EPA had failed to specify the health or welfare significance of the short-term peaks that it might consider as meeting this description, and that in any event UARG's attempt to show that short stacks could cause a large number of short-term peaks was technically flawed in several different ways.

Response. Extensive discussion of the downwash phenomenon, as well as the aerodynamic effects of buildings and terrain features on windflow patterns and turbulence, is contained in the technical and guidance documents previously listed in this notice. To summarize briefly, numerous studies have shown that the region of turbulence created by obstacles to windflow extends to a height of approximately 2.5 times the height of the obstacle. Pollutants emitted into this region can be rapidly brought to the ground, with limited dilution. Though this tendency decreases the higher vertically within the downwash region that the plume is released, because of the highly unpredictable nature of downwash and the lack of extensive quantitative data, it is extremely difficult to reliably predict plume behavior within the downwash region. As noted in the comments submitted, the distinguishing features of downwash do not show up well over an averaging time as long as 1 hour or more. Pollutant concentrations resulting from downwash can arise

and subside very quickly as meteorological conditions, including wind speed and atmospheric stability vary. This can result in short-term peaks, lasting up to 2 minutes or so, recurring intermittently for up to several hours, that significantly exceed the concentrations of the 3- and 24-hour NAAQS. Little quantitative information is available on the actual levels of these peaks, or on the frequency of their occurrence since most stacks have been designed to avoid downwash and because downwash monitoring is not typically conducted.

A number of modeling and monitoring studies in the record assess the significance of downwash when plumes are released into the downwash region. The most important of these are a number of studies cited in the November 9 proposal showing that for sources with sulfur dioxide (SO_2) emission rates of 4 to 5 pounds per million British Thermal Units (lb./mmBTU), stacks releasing the plume into the downwash region can significantly exceed the 3-hour NAAQS.

The utility industry submitted monitoring results from four sites showing that facilities with short stacks (ranging from 23 to 89 percent of formula height) generated many short-term peaks in the vicinity of the plant at concentrations at least 2 times the highest concentration of the 3-hour SO_2 standard, i.e., 1 ppm for up to 10 minutes. Those concentrations are the maximum that could be recorded by the monitors used. There is no way to determine from these data the true peak ground-level concentrations.

The NRDC, in commenting on this subject, has argued that downwash-related concentrations are largely theoretical, since stacks have generally been built to avoid downwash, and that actual concentrations occur under other meteorological conditions such as "inversion break-up fumigations" and "looping plums," that can equal these "theoretical" concentrations predicted under down-

wash.[1] The NRDC also criticized the utility data on numerous technical grounds.

EPA's studies indicate that, when stacks are a significantly less than GEP formula height, high short-term concentrations can indeed occur due to downwash that are in the range of the values reported by the utility industry. Concentrations produced by the other conditions cited by NRDC, though high, may be lower by an order of magnitude, and occur less frequently by as much as two orders of magnitude, than those produced by downwash.[2] As stack height approaches the height determined by the GEP formula, the expected frequency and severity of short-term peaks due to downwash becomes less certain. This is to be expected, since it is the purpose of a formula height stack to avoid excessive downwash. While it might theoretically be possible for EPA to revise the GEP formula downward (e.g., from H + 1.5L to H + 1.2L, or some other value), such a revision would have little purpose. By moving the release point further into the downwash region, such a change would increase the probability of high downwash-caused peaks. On the other hand, such relatively small changes in stack height are not likely to appreciably affect the emission limitation for the source. This is because emission limitations are calculated based on physical stack height and associated plume rise under atmospheric conditions judged most controling for the source. Increasing or decreasing stack

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[1] In "inversion breakup fumigation," an inversion layer dissipates due to heating of the ground, letting the pollutants that were trapped in it descend suddenly to ground level. In "looping plumes," a plume is brought down to the ground close to the source in the form of intermittant puffs under very unstable atmospheric conditions.

[2] "Comments on Peak Ground-Level Concentrations Due to Building Downwash Relative to Peak Concentrations Under Atmospheric Dispersion Processes." Alan H. Huber and Francis Pooler, Jr. June 10, 1985.

height by a small fraction will not greatly change the rate or extent of dispersion and thus will not affect the ground-level concentration. Moreover, as EPA noted in its November 9 proposal, no data presently exist on which to base a revision to the formula.

The NRDC submitted data to EPA which it believed to support the conclusions that it urged EPA to adopt concerning short-term peak concentrations under other meteorological conditions.[3] However, these data were not presented in a form that could be readily interpreted, and EPA has thus far been unable to draw any conclusions from them.[4]

In reviewing NRDC's comments on building downwash, EPA agrees that there is great uncertainty about our present understanding of this phenomenon, and this is supported by the range and variation of downwash effects observed in recent studies. However, no information has been presented which would convince EPA to abandon the present GEP formulae in favor of any alternative.

The health and welfare significance of downwash concentrations that result in violations of the ambient standards are documented and acknowledged in the standards themselves. The significance of short-term peaks at the levels that EPA's analyses predict is more judgmental. However, a number of studies cited in EPA's "Review of the National Ambient Air Quality Standards for Sulfur Oxides: Assessment of Scientific and Technical Information" (EPA-450/5-82-007, November 1982), indicate that concentrations of one ppm sustained for durations of 5 minutes or more can produce bronchoconstriction in asth-

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[3] Memorandum from David G. Hawkins, NRDC, to William F. Pedersen, Jr., Office of General Counsel, USEPA, May 29, 1985.

[4] Memorandum from Alan H. Huber, ASRL, to David Stonefield, OAQPS, June 21, 1985.

matics accompanied by symptoms such as wheezing and coughing. Such concentrations are well within the range of concentrations that can result from downwash. When sources meet the ambient standards, the frequency of occurrence for these concentrations under the other conditions cited by NRDC is substantially lower than for downwash when stacks are less than GEP.

GEP Formula Stack Height. Some commenters, including NRDC, stated that EPA cannot justify retention of the traditional (2.5H) and refined (H + 1.5L) GEP formulae based simply on their relationship to the 40-percent criterion, and argued that the formulae provide too much credit in many or most cases. This, they argue, results in allowing sources to obtain unjustifiably lenient emission limitations.

Other commenters argued that Congress explicity reaffirmed the traditional GEP formula, and that EPA should allow maximum reliance on it (and, by implication, on the refined formula that was subsequently derived from it).

Responses. The use of EPA's refined formula as a starting point for determining GEP was not called into question by any litigant in the *Sierra Club* case. The court's opinion likewise does not question the use of the formula as a starting point. A detailed discussion of the court's treatment of the formula, showing how it endorsed the formula's presumptive validity, is contained in the Response to Comments document.

Despite this limited endorsement, EPA might need to revisit the formula on its own if its reexamination of the "excessive concentration" and modeling issues indicated that the formula clearly and typically misstated the degree of stack height needed to avoid downwash concentrations that cause health or welfare concerns.

However, no such result has emerged from our reexamination. Stacks below formula height are associated

with downwash-related violations of the air quality standards themselves where emission rates significantly exceed the levels specified by NSPS. Even where emissions are low, downwash conditions at stacks below formula height can be expected, unlike other conditions, to generate numerous short-term peaks of air pollution at high levels that raise a real prospect of local health or welfare impacts.

As EPA stated in the proposal, it is impossible to rely primarily on fluid modeling to implement the stack height regulations, particularly under the timetable established by the court, 49 FR 44883 (November 9, 1984). No commenter other than NRDC even suggested a different formula that in their eyes would be better, and NRDC's suggestions were premised on their "control first" position, which EPA has found inconsistent with the statute and has rejected. EPA considers the refined formula to be the state-of-the-art for determining necessary stack height.

Given the degree of presumptive validity the formula already possesses under the statute and the court opinion, we believe that the record amply supports its reaffirmation.

Stacks Above GEP Formula Height. The EPA's 1976 stack height guidelines [cite] imposed special conditions on stacks above formula height—the installation of control technology—that were not imposed on lower stacks. Similarly, EPA's 1973 proposal had made credit above formula height subject to a vaguely defined "detailed investigation" (38 FR 25700). The legislative history of the 1977 Clean Air Act Amendments cautioned that credit for stacks above formula height should be granted only in rare cases, and the Court of Appeals adopted this as one of the keystones of its opinion. The court also concluded that Congress deliberately adopted very strict requirements for sources locating in hilly terrain.

For these reasons, EPA is requiring sources seeking credit for stacks above formula height and credit for any stack height justified by terrain effects to show by field studies or fluid modeling that this height is needed to avoid a 40-percent increase in concentrations due to downwash and that such an increase would result in exceedance of air quality standards or applicable PSD increments. This will restrict stack height credit in this context to cases where the downwash avoided is at levels specified by regulation or by act of Congress as possessing health or welfare significance.

To conduct a demonstration to show that an absolute air quality concentration such as NAAQS or PSD increment will be exceeded, it is necessary to specify an emission rate for the source in question.[5] The EPA believes that in cases where greater than formula height may be needed to prevent excessive concentrations, sources should first attempt to eliminate such concentrations by reducing their emissions. For this reason EPA is requiring that the emission rate to be met by a source seeking to conduct a demonstration to justify stack height credit above the formula be equivalent to the emission rate prescribed by NSPS applicable to the industrial source category. In doing this, EPA is making the presumption that this limit can be met by all sources seeking to justify stack heights above formula height. Sources may rebut this presumption, establishing an alternative emission limitation, on a case-by-case basis, by demonstrating to the reviewing authority that the NSPS emission limitation may not feasibly be met, given the characteristics of the particular source.[6] For example, it may be possible for a source

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[5] In contrast, if the test of "excessive concentrations" involved a simple percentage increase, there would be no need to specify an emission rate, since the increase in concentration caused by downwash is independent of emission rates.

[6] The EPA will rely on its Best Available Retrofit Technology Guideline in reviewing any rebuttals and alternative emission limitations.

presently emitting SO_2 at a rate of 1.8 lb./mmBTU to show that meeting the NSPS rate of 1.2 lb./mmBTU would be prohibitive in that it would require scrapping existing scrubber equipment for the purpose of installing higher efficiency scrubbers. Similarly, a source may be able to show that, due to space constraints and plant configuration, it is not possible to install the necessary equipment to meet the NSPS emission rate. In the event that a source believes that downwash will continue to result in excessive concentrations when the source emission rate is consistent with NSPS requirements, additional stack height credit may be justified through fluid modeling at that emission rate.

A source, of course, always remains free to accept the emission rate that is associated with a formula height stack rather than relying on a demonstration under the conditions described here. The third alternative mentioned in the proposal—using the actual emission limit for the source—has been rejected because, to the extent that limit relied on greater than formula height, it would amount to using a tall stack to justify itself.

The EPA's reliance on exceedances, rather than violations of the NAAQS and PSD increments, is deliberate. Fluid modeling demonstrations are extremely complicated to design and carry out, even when the most simple demonstration criteria—that is, a percentage increase in concentrations, with no consideration of absolute values—are assumed. Adding consideration of an absolute concentration such as a NAAQS or PSD increment substantially complicates this effort further and introduces the scientific uncertainties associated with predicting an exceedance of a 3-hour or 24-hour standard based on 1 hour or less of modeling data. Using an hour or less of modeling values, based on one set of meteorological data, to draw the distinction between only one exceedance of the standard during the 8760 hours in a year, and the two or more that constitute a violation pushes that un-

certainty beyond reasonable limits. EPA therefore does not find the additional difficulties that would be created by requiring violations instead of exceedances to be warranted. That is particularly so here, given that the regulations require sources seeking credit above the formula to be well-controlled as a condition of obtaining such credit.

Use of an absolute concentration in the test of "excessive concentrations" can lead to problems of administering the program, in that it can have a "zoning" effect. Since a source can only get stack height credit to the extent that it is needed to avoid a PSD increment or NAAQS exceedance, an emissions increase in the area of that source may increase concentrations beyond the controlling limit, thereby making it difficult for new sources to locate in the area, or for sequential construction of additional emitting units at the source in question.

This effect cannot be avoided under any test for "excessive concentrations" that is tied to absolute concentrations. However, that effect will be mitigated by the fact that the use of this approach is voluntary and limited to sources wishing to rely on fluid modeling to justify stack height credit. Moreover, the effects of downwash tend to occur very near the source, usually on fenced company property. Since concentrations measured at such locations are not used to evaluate NAAQS attainment or PSD increment consumption, new sources wishing to locate in the area are less likely to be affected.

Sources planning sequential construction of new emitting units at one location or contemplating future expansion can reduce the uncertainties noted above by initially obtaining permits for the total number of units anticipated and by planning for expansion in the calculation of necessary physical stack height. In the latter instance, only the allowable stack height credit would be revised as expansion is carried out—not actual stack height.

An additional theoretical complication is presented when an absolute concentration is used where meteorological conditions other than downwash result in the highest predicted ground-level concentrations in the ambient air. In such cases, a source that has established GEP at a particular height, assuming a given emission rate, may predict a NAAQS violation at that stack height and emission rate under some other condition, e.g., atmospheric stability Class 'A.' Reducing the emission rate to eliminate the predicted violation would result in stack height credit greater than absolutely necessary to avoid an excessive concentration under downwash. However, reducing stack height places the source back in jeopardy of a NAAQS violation under the other meteorological condition, and so on, "ratcheting" stack height credit and emission rates lower and lower. The EPA has eliminated this "ratcheting" potential in the GEP guideline by providing that, once GEP is established for a source, adjusting the emission rate to avoid a violation under other conditions does not require recalculation of a new GEP stack height.

EPA is making this part of the regulations retroactive to December 31, 1970. In the terms of the court's retroactivity analysis, stacks greater than formula height represent a situation that Congress did affirmatively "intend to alter" in section 123. Moreover, EPA regulatory pronouncements since 1970 have placed a stricter burden on sources raising stacks above formula height than on others.

No source is precluded from building a stack height greater than formula height if such height is believed to be needed to avoid excessive downwash. However, the design and purpose of section 123 prohibit SIP credit for that effort unless a relatively rigorous showing can be made.

Given the ability of sources to avoid modeling and rely on validity of the GEP formulae and requirement for fur-

ther control of emissions in conjunction with stack heights in excess of formulae height, the result predicted by UARG—exceedances of the NAAQS or PSD increments due to inadequate stack height—is highly unlikely.

The potential effect of changes in background air quality on stack height credit is not substantially different from the effect that such changes in background can have on source emission limitations in nonattainment areas. In the first case, however, sources may be able to address these effects through greater stack height if such changes affect the concentrations under downwash. Moreover, the possibility that shifting background air quality can yield different calculations of GEP is significantly limited by the fact that consideration of background in GEP calculations is restricted to those cases where credit for greater than formula height is being sought or sources are seeking to raise stacks to avoid excessive concentrations.

Raising Stacks Below Formula Height to Formula Height. In response to EPA's proposal to allow automatic credit for GEP formula height, several commenters have argued that EPA has failed to adequately respond to the court's directive to "reconsider whether, in light of its new understanding of 'excessive concentrations,' demonstrations are necessary before stack heights may be raised, even if the final height will not exceed formula height".

Response. Raising a stack below formula height to formula height is not, in EPA's judgment, subject to the same statutory reservations as building stacks greater than formula height. However, as the court has cautioned, it may still be necessary for these sources to show that raising stacks is necessary to avoid "excessive concentrations" that raise health or welfare concerns.

For these reasons, sources wishing to raise stacks subsequent to October 11, 1983, the date of the D.C. Circuit opinion, must provide evidence that additional height is

necesary to avoid downwash-related concentrations raising health and welfare concerns. These rules allow sources to do this in two ways.

The first way is to rebut the presumption that the short stack was built high enough to avoid downwash problems; i.e., to show, by site-specific information such as monitoring data or citizen complaints, that the short stack had in fact caused a local nuisance and must be raised for this reason. The EPA believes that both the historical experience of the industry and the data on short-term peaks discussed earlier show that short stacks can cause local nuisances due to downwash. However, where a source has built a short stack rather than one at formula height, it has created a presumption that this is not the case. General data on short-term peaks may not be strong enough to support, by themselves and in the abstract, a conclusion that the stack must be raised to avoid local adverse effects. Instead, that proposition must be demonstrated for each particular source involved.

In the event that a source cannot make such a showing, the second way to justify raising a stack is to demonstrate by fluid modeling or field study an increase in concentrations due to downwash that is at least 40-percent in excess of concentrations in the absence of such downwash and in excess of the applicable NAAQS or PSD increments. In making this demonstration, the emission rate in existence before the stack is raised must be used.

Since raising stacks to formula height is not subject to the same extraordinary reservations expressed by Congress and the court with respect to stacks being raised above formula height, EPA does not believe that the use of presumptive "well-controlled" emission rate is appropriate here. As discussed in EPA's response to NRDC's "control first" argument, the basic purpose of section 123 was to take sources as it found them and, based on those circumstances, to assure that they did not avoid control

requirements through additional dispersion. Use of a source's actual emission rate in this instance is consistent with that basic purpose and, absent special indications of a different intent, should be used in stack height calculations.

The EPA believes that it is most unlikely that any source with a current emission limitation has failed to claim full formula credit for a stack of formula height. Accordingly, the question whether a source can receive stack height credit up to formula height will involve only sources that want to actually raise their physical stack, not sources that simply want to claim more credit for a stack already in existence. A source will presumably not go to the trouble of raising an existing stack without some reason. If a source cannot show that the reason was in fact the desire to avoid a problem caused by downwash, then the inference that it was instead a desire for more dispersion credit is hard to avoid. A nuisance caused by downwashed emissions could include citizen or employee complaints or property damage. A source would be expected to show that complaints of this nature were reasonably widespread before getting credit under this section.

The EPA does not intend to make this rule retroactive to stacks that "commenced construction" on modifications that would raise them to formula height prior to October 11, 1983. Applying the court's retroactivity analysis, it appears:

1. The new rule does depart from prior practice. The EPA's 1973 proposed rule affirmatively encouraged sources with shorter stacks to raise them to formula height.[7] Though EPA's 1976 guideline can be read as imposing a "control first" requirement on some stack

[7] "The use of stack height up to the level of good engineering practice is encouraged by EPA in order to avoid local nuisances." (38 FR 25700).

height increases, its general thrust gave automatic credit for all stacks that met the "2.5" times formula.[8] Automatic permission was similarly set forth in the 1979 proposal, in the 1981 reproposal, and in the 1982 final rule. Only a notice published in 1980, but later withdrawn, departs from this trend, requiring the use of field studies or fluid modeling demonstrations to justify stack height increases up to GEP formula height.[9] Even then, the notice would have made this policy prospective in its application.

2. Sources that raised stacks in reliance on this past EPA guidance assuming the availability of dispersion credit cannot be distinguished from the sources, in the example approved by the court, that built stacks to the traditional formula in an identical expectation of dispersion credit.

3. It cannot be said that the raising of stacks to formula height is a practice that Congress "affirmatively sought to end." It is not mentioned in the text of the statute or its legislative history. Further, as the court has already noted, the statute attributes a degree of presumptive validity to the formula on which sources that raise their stacks will have relied.

Discretion to Require Fluid Modeling. Several commenters argued that EPA's proposal to allow agencies to require the use of fluid modeling was unnecessary, since EPA had already documented the validity of the GEP formulae. Furthermore, these commenters argue that this allowance would make fluid modeling the rule, rather than the exception. This would result, the commenters state, because it was their expectation that agencies or environmental groups would nearly always call for fluid

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[8] 41 FR 7451 (February 18, 1978); Guideline Sections B.1 C.1(2), C.2(2).

[9] 45 FR 42279 (June 24, 1980); specific discussion of stack height credit is discussed at 42281-2.

modeling demonstrations during the permit application and review process.

Other commenters stated that providing the discretion to require fluid modeling was appropriate, since EPA had failed to demonstrate that the GEP formulae represented the minimum height necessary to avoid excessive concentrations.

Response. The Court of Appeals directed EPA to reexamine whether its rules should allow States, as a matter of discretion, to require even sources that planned to rely on the formula to show instead by fluid modeling that a stack this high was required to avoid dangers to health and welfare caused by downwash. The court suggested that EPA should include such a provision unless it could find that the formula was so accurate, or tended so much to err on the low side, as to make discretionary authority to adjust formula height downward unnecessary.

The EPA believes that the court was mistaken in its conclusion that a stack at formula height is likely to generate downwash concentrations as great as 40 percent only in uncommon situations. In fact, EPA's observations indicate that when stacks are built to GEP formula height, an increase in concentrations due to downwash can still be expected to occur that is between 20 and 80 percent greater than the concentration that would occur in the absence of building influences.[10]

Nevertheless, in response to the court's remand, EPA is including in this final rule a provision for the authority administering these rules to require field studies or fluid modeling demonstrations, even for stacks built to formula height, in cases where it believes that the formula may

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[10] Guideline for Determination of Good Engineering Practice Stack Height, pp. 20-23. This is further illustrated in Figures 5 and 6.

significantly overstate the appropriate stack height credit.[11]

While EPA believes the formula is a reasonable rule of thumb indicating the stack height needed to avoid some probability of a standards violation and a significantly greater probability of a local nuisance, actual results in any given case may vary somewhat based on specific circumstances. The EPA has attempted to minimize this possibility within the limits of available data by identifying two particular situations in whch it believes that the formulae may not be reliable indicators of GEP: Porous structures and buildings whose shapes are aerodynamically smoother than the simple block-shaped structures on which the formulae are based.[12] However, EPA acknowledges that other situations, of which the Agency is not presently aware, may arise wherein the formulae may not be adequate.

The EPA intends to "grandfather" any source that relied on the formula in building its stack before the date of EPA's 1979 proposal from the effect of this discretionary reexamination requirement.

Only in that proposal did EPA first suggest that such a discretionary reexamination provision might be included in the final rule. The retroactivity analysis set

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[11] Quite apart from any such regulatory provision, States have authority to require such demonstrations, on the terms outlined or on stricter or more lenient terms, under the savings provisions of section 116 of the Clean Air Act.

[12] Earlier EPA guidance, although expressing reservations about the accuracy of the formula when applied to ruined structures. allowed its use for certain tapered structures and cooling towers. "Guideline for Determination of Good Engineering Practice Stack Height." July 1981 at 36-40. For this reason, EPA will grandfather any credits for such structures that were granted prior to November 9, 1984. Since EPA guidance has never allowed credit for porous structures, the restriction in this rule for such structures applies to all stacks in existence since December 31, 1970.

out earlier therefore supports exempting stacks built in reliance on EPA guidance before that date from discretionary reexamination. Indeed, a failure to "grandfather" these sources would lead to the paradoxical result that a source that had built a GEP stack under the traditional EPA formula would have its direct reliance interests protected by the "grandfather" provision previously upheld by the court, but could then lose that "grandfathered" credit through a case-specific demonstration requirement showing that the traditional formula was somewhat inaccurate—the very reason behind the change in the formula properly found non-retroactive by EPA earlier.

Given this background, EPA believes that the effect on emissions of including or of excluding a provision for discretionary determinations from this rule is likely to be very small. Building stacks above formula height, and raising stacks below formula height to formula height, are covered by regulatory provisions already discussed. The only case left for discretionary determinations to address is the building of stacks at formula height in the post-1979 period. However, all major sources built since that time are already controlled to SO^2 emission rates no greater than 1.2 lb./mmBTU—and, not uncommonly much less—under various EPA regulations. All new power plants on which construction "commenced" since 1971 must meet EPA's NSPS mandating an emission rate no greater than this level. That standard was tightened for all power plants on which construction "commenced" after 1979. In addition, all "major" sources built since 1977 in areas subject to the Act's PSD requirements have had to install best available control technology. That technology must require the greatest degree of emission control that is achievable considering technology, economics, and energy impacts.[13]

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[13] Clean Air Act section 188.

If such sources had to show that use of a formula height stack was needed to avoid exceedances of the NAAQS or PSD increments, that might prove difficult for many of them. The likelihood of such exceedances tends to decrease as the emission rate for the source decreases. By the same token, the incremental emission reductions available from the sources that are at issue here tend to be small and among the most expensive available. In terms of emission reductions, little is at stake where these sources are concerned.

Accordingly, the rules will require such sources, if a reviewing authority calls for a demonstration, to the rules show that the use of a formula stack height is needed to avoid a 40-percent increase in concentrations due to downwash. This will provide a rough check on whether the formula, as applied in the particular case at issue, produces the result it was designed to produce.

The EPA is not providing here for sources to justify their formula height stacks by arguing that the height in excess of that needed to avoid NAAQS violations is needed to avoid a local nuisance. The discretionary modeling requirement is designed for application to stacks before they were built. Beyond that, there is no way to determine based on the *absence* of a local nuisance that a formula height stack is not too tall, in the way that the *presence* of a nuisance shows that a stack under formula height in fact is too short. Accordingly, there will be no way, as there was with short stacks being raised, to determine from actual experience whether a local nuisance would occur at a shorter stack height. Though avoiding local nuisance is a legitimate purpose for which stacks are built, it would be very difficult to show by modeling what stack height was needed to avoid it.

Some commenters have misunderstood EPA's allowance of discretion to require fluid modeling as requiring such modeling whenever *any* individual or entity called

for such a demonstration. This discretion rests explicitly with the reviewing agencies who have always had the prerogative to require more stringent analyses in the SIP process, and no obligation is implied for these agencies to require fluid modeling simply because it has been called for by some individual during the permit review process. It is EPA's expectation that technical decisions to require such additional demonstrations would be based on sound rationale and valid data to show why the formulae may not be adequate in a given situation. In any case, given the burden of reviewing a fluid modeling demonstration, an agency is not likely to exercise this option absent sufficient justification. Consequently, EPA disagrees with the commenters' contention that fluid modeling will supplant the use of the GEP formulae, except in what EPA believes will be unusual instances.

Reliance on the 2.5H Formula. In limiting the applicability of the 2.5H formula to those cases where the formula was actually relied upon, the November 9 proposal defined such reliance in terms of stack design. A number of comments indicated that actual stack design and construction may ultimately be control, not by the 2.5H engineering rule, but by construction materials specifications. Consequently, while 2.5H rule may have provided an initial starting point in stack design, the rule may not have dictated final stack height. In other cases, it was argued that a number of source owners may have constructed their stacks in excess of what was determined to be minimum GEP for precautionary reasons, for process requirements, or in anticipation of additional growth in the area surrounding the facility, even though emission limitations for these sources would have been limited then, as now, to formula height. Consequently, it was argued that EPA should allow sources to demonstrate reliance on the formula in the calculation of emission limits as well as in the design of the stack.

In response to EPA's request for comments on what evidence should be considered acceptable in determining

reliance on the 2.5H formula, some commenters urged EPA to consider reconstructed evidence, e.g., affidavits from design engineers or copies of correspondence indicating past relience on EPA guidance. Other commenters stated that "reliance" should be very strictly construed, that EPA should be circumspect in its review of reliance demonstrations, and that only contemporaneous documentary evidence, such as blueprints and facility design plans, be accepted as evidence.

Response. The EPA is in general agreement with the view that reliance should be considered in relation to the emission limitation for the source, not the design. Since section 123 specifically prohibits EPA from regulating actual stack heights and rather regulates stack height credits used in setting emission limitations, it would be illogical to require that sources demonstrate reliance on the 2.5H formula for actual stack design. Moreover, such an approach would contradict principles of sound planning, in that it would penalize those sources that have built taller stacks in anticipation of facility expansion or other growth in the area that could influence GEP determinations.

If a stack has been built taller than 2.5H formula provides, while the emission limitation has been calculated assuming 2.5H credit, a convincing demonstration has been made that the source properly relied on the formula. Conversely, if the emission limitation for the source is based on some other stack height credit, such as 2.8H, 3.5H or some other number, it would be difficult to show that the GEP formula had in fact been relied on.

In some cases the emission limit information may be unavailable or inconclusive. In such cases, EPA will allow reliance on reconstructed evidence of construction intent.

In comments submitted during the public comment period and in response to questions raised by EPA at the public hearing held on January 8, 1985, industry representatives repeatedly stated that contemporaneous evidence of reliance on the 2.5H formula, such as facility design plans, dated engineering calculations, or decision records are rarely, if ever, retained for more than a few years after construction of the facility is completed. Consequently, they argued that most cases of legitimate reliance would be denied if contemporaneous evidence were required in order to retain for the 2.5H formula.

The EPA agrees. Additionally, credit afforded by the 2.5H formula in excess of that resulting from the use of the H+1.5L derivative is likely to be small, except when the building on which stack height credit is based is substantially taller than it is wide. Finally, it is EPA's view that the court did not intend that sources be subject to a rigorous or overly stringent of reliance, but only that they be accorded a reasonable opportunity to show reliance on the 2.5H formula. For these reasons, EPA will allow the submission of reconstructed, i.e., non-contemporaneous documentary evidence to demonstrate reliance on the 2.5H formula.

Definition of "Nearby". Comments were submitted by UARG and others, arguing that, effectively, no limitation should be placed on the consideration of terrain-induced downwash. Alternatively, some of these commenters argued that the court decision requires that a limitation be adopted that does not apply any distance restriction of ½ mile in modeling terrain effects such as is applied to structures in the use of GEP formulas, but rather allows consideration of all terrain that results in the same downwash effect as those structures within ½ mile of the stack.

Other commenters have argued that the court decision and legislative history preclude EPA from allowing con-

sideration of any terrain beyond a distance of ½ mile, regardless of where it begins.

Response. For the reasons summarized below, EPA does not accept either the interpretation that the court decision authorizes EPA to adopt a definition based solely on effect, or that it limits consideration exclusively to terrain features falling entirely within ½ mile.

When Congress discussed the allowance of credit for stack height to address downwash, it stated that the term "nearby" was to be "strictly construed" noting that if the term were to be interpreted "to apply to man-made structures *or terrain features* ¼ to ½ mile away from the sources or more, the result could be an open invitation to raise stack heights to unreasonably high elevations and to defeat the basic underlying committee intent." [14]

In its opinion, the court held that EPA could not give unlimited credit when modeling terrain features because that would conflict with the Congressional intention to impose artificial limits on that credit. The court was not presented with, and did not address, the question of what to do about terrain features that "began" within ½ mile and extended outside it. The approach adopted by EPA carried out this congressional purpose to impose an artificial limit but at the same time reflects the real facts more closely than an absolute ½ mile limitation.

Unlike man-made structures, terrain features do not have readily definable dimensions other than height. For this reason, EPA has defined "nearby" as generally allowing inclusion of consideration of terrain features that fall within a distance of ½ mile of the stack. EPA's definition will permit consideration of such terrain that extends beyond the ½ mile limit if the terrain begins within ½ mile, allowing that portion within 10 times the

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[14] H.R. Report, No. 294, 95th Cong., 1st Sess. 93 (1977).

maximum height of the feature, not to exceed 2 miles, as described in the proposal.

To define when a terrain feature "begins" within ½ mile, EPA has related terrain height at the ½ mile distance to the maximum stack height that could be justified under the other two methods for determining GEP. Accordingly, EPA will require that terrain features reach a height at the ½ mile distance limit of either 26 meters (i.e., 65 meters divided by 2.5) or 40 percent of the stack height determined by the GEP formulae applied to nearby buildings.

Treatment of New versus Existing Sources Under the Definition of "Nearby". In the proposal, EPA requested comment on whether new sources should be treated differently from existing sources and presented two options for addressing them.

Few comments were received on these options. Several questioned the logic of distinguishing between new and existing sources in the regulations. One commenter argued that new and existing sources should both be subject to the strict ½ mile limit proposed under one option for new sources only. This has already been discussed under EPA's response to comments on the general definition of "nearby" and is not addressed further here.

Response. New sources are initially subject to more stringent control requirements than many existing sources. Consequently, it is less likely that the emission limitations and stack height credits for these sources will be affected by terrain features. Furthermore, EPA believes that the effect of applying a more restrictive distance limitation will be insignificant and will result only in minor changes in siting, rather than substantial relocation of sources. For this reason, EPA has selected the second option, treating new and existing sources identically under the definition of "nearby."

EPA is giving this definition of "nearby" retroactive application to December 31, 1970. The court's decision makes clear its conclusion that Congress affirmatively focused on this issue and decided thus making application as of the enactment date proper.

Definition of Other Dispersion Techniques. The EPA received many comments on the proper scope of the definition of "dispersion techniques," and perhaps more on the appropriate bounds of the exclusions. Industry commenters generally argued that EPA has improperly proposed to deny consideration for plume-enhancement effects that are "coincidental" with techniques and practices routinely carried out for sound engineering and economic reasons. They argued that EPA should prohibit credit only when a technique or practice was decisively motivated by a desire for dispersion credit. Such an approach would create a "but for" test using the intent of the source owner or operator as the basis for EPA's decisions.

Other commenters argued that EPA must use a test based purely on *effects*, prohibiting credit where a technique or practice has the effect of enhancing dispersion, regardless of any other justification.

Response. In the final regulation, EPA has rejected the polar positions discussed above. The argument that dispersion *effects* are forbidden regardless of motive is discussed and rejected as a part of the general response to the argument that only "well-controlled" sources can receive any dispersion credit.

Conversely, a pure "but for" test runs the risk of creating exclusions that effectively swallow the rule itself. The EPA judges that few, if any, circumstances are likely to arise in which some other benefit or justification cannot be asserted as the basis for a practice, and therefore for such an exclusion.

Where prospective evaluation of merged gas streams, or combined stacks, is concerned, there is no reason to assume the serious administrative burdens investigating such claims might entail. The court directed EPA to apply an intent test "at a minimum," and left it free to take an approach that may be less generous toward credit for combined stacks. Since sources in the future will be able to plan against the background of rules that define permissible credits precisely, little unfairness results from a restrictive approach.

When retrospective application is concerned, however, the retroactivity analysis spelled out by the court directs that an intent-based test be employed as described later.

Accordingly, after considering the record on these matters, EPA has determined to take a "middle-ground" approach to this question. The final regulation retains the same broad prohibition found in the proposal on increasing exhaust gas plume rise by manipulation of parameters, or the combining of exhaust gases from several existing stacks into one stack, with several classes of exclusions. These exclusions recognize the existence of independent justifications based on engineering and/or economic factors, and include:

(1) Demonstration of original facility design and construction with merged gas streams;

(2) Demonstration that merging after July 8, 1985 is part of a change in operation that includes the installation of pollution controls and results in a net reduction in allowable emissions of the pollutant for which credit is sought; or

(3) Demonstration that merging before July 8, 1985 was part of a change in operation that included the installation of control equipment, or was carried out for sound economic or engineering reasons. An allowable emissions increase creates the

presumption that the merging was not carried out for sound economic or engineering reasons.[15]

Of these exclusions, the first is identical to the proposal, and the second and third are modifications of the second exclusion included in the proposal, with a refinement based on prospective/retroactive application.

The first exclusion was retained for the reasons stated in the proposal. After reviewing the comments submitted, EPA determined that its previous conclusion—that standard practice in designing and constructing facilities routinely includes venting emissions from several units into a common or multiflued stack—is correct. Sound engineering and economic reasons, based on costs of constructing and maintaining separate stacks, availability of land, and cost savings for pollution control equipment support facility design and construction considerations. Even if air pollution requirements did not exist at all, sources would have incentives to use as few stacks as possible.

Since *increasing* plume rise, rather than plume rise itself, is a "dispersion technique" and original design and construction define the initial base, such original design and construction of merged gas streams is not considered a dispersion technique. Moreover, in designing the facility, a source can usually choose to build one larger unit rather than several smaller units. Therefore, prohibiting credit for original design generally only effect the design of units and not the plume rise.

Objections have been raised to applying this logic to sources which are constructed over a period of time, but use a single stack. However, the same factual arguments just listed would apply is the same, if the original design included provision for the additional units in the plans for the facility, and in the design and construction of

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[15] In cases where no emission limit existed for a source prior to the merging, such merging is not to result in any increase in the actual emissions that occurred prior to the merging.

the stack. In such a case, the later units merged into the stack would be included within the exclusion.

In addition, it would be logically very difficult to apply a rule denying credit to original design stacks. EPA or the State would have to assume how many stacks would have been built absent a desire for dispersion credit, where they would have been located, and how high they would have been. Since these alternative stacks would be purely hypothetical, there would be no clear way of answering these questions; the answer would simply have to be selected arbitrarily from the wide range of possible answers. This problem is absent when existing stacks have been combined.

In contrast, EPA finds changes from the original design of a facility in order to include merged stacks to require a narrower judgment. The EPA concluded that, where prospective application is concerned, the exclusion should be available only to sources that combine stacks reduces allowable emissions of the pollutant for which the credit is granted. There are obvious economic advantages in combining stacks to reduce the number of emission control units that must be purchased. In addition, the installation of pollution control for the pollutant in question provides substantial assurance that the purpose of the combination is not to receive a more lenient emission limit.

However, given past EPA guidance on merging of stacks, EPA has concluded that retroactive application of this test would not be proper. The EPA guidance documents uniformly took the view that merging of separate stacks into a single stack "is generally not considered a dispersion technique" absent other factors such as excessive use of fans or other devices.[16] Each docu-

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[16] Memorandum from Darryl Tyler to Steven Rothblatt. August 20, 1980. See also letter from Walt Barber from Howard Ellis. October 6, 1980, and from David Stonefield to Joseph Paisia, June 17, 1980.

ment provided guidance to a source of a Regional Office regarding the proper treatment of merged stacks in calculating emission limitations. Considering these statements, EPA must consider the standards expressed by the court, as previously discussed in this notice, in judging the propriety of a differing standard for retroactive application. Given the nature and applications of the guidance which it issued in the past, EPA judges the first two criteria—that is, whether the new rule represents an abrupt departure from well-established practice, and whether the parties against whom the new rule is applied relied on the former rule—to be satisfied. In addition, applying the prospective criteria to past practice would require significant changes in fuel and/or control equipment for parties whose emission limits were based on previous guidance. Finally, and particularly where sources have not been allowed to increase their previous emissions as a result of the combining of stacks, EPA does not judge the statutory interest to be overriding in this instance, since the rule even in its retrospective version only exempts sources that can show a reasonable non-dispersion enhancement ground for combining stacks, and thereby implements the "intent" test suggested by the court. On the other hand, EPA has never suggested that combined stacks that *cannot* meet such a test are proper. Sources whose actual emissions are increased, or whose emission limitations are relaxed in connection with the combining of stacks create a strong presumption that the combination was carried out in order to avoid the installation of controls. Such combinations would indeed run counter to the statutory purpose, and retrospective application of a test that forbids them is therefore proper.

Exemptions from the Definition of Dispersion Techniques. The EPA received numerous comments in response to its request for input on what consideration, if any, should be given to excluding sources from the

definition of "Dispersion Techniques" whose emissions are below a specified level or whose stacks are less than the *de minimis* height. These commenters argued that combining gas streams in particular often had an economic justification independent of its effects on dispersion, and therefore should not be generally forbidden. Other comments stated that, in considering any such exclusion, EPA should consider the effect on total atpospheric loadings.

Response. Some limitation on the number of sources affected by the definition at "dispersion techniques" necessary for EPA to carry out the stack height program. There are currently estimated to be over 23,000 sources of SO_2 in the United States with actual emissions exceeding 100 tons per year. It would not be possible for EPA or States to review the emission limits of even a significant fraction of this number within a reasonable time period. Twenty-two thousand of these sources have emissions less than 5,000 tons per year and contribute a total of less than 13 percent of the total annual SO_2 emission.[17] For this reason, and for reasons of administrative necessity discussed earlier, EPA is adopting an exemption from prohibitions on manipulating plume rise for facilities with allowable SO_2 emissions below 5,000 tons per year. The EPA believes the effect of this exemption on total SO_2 emissions to be *de minimis* in nature. Even if these sources were able to increase their emission rates as the result of an exemption from the definition of dispersion techniques, their combined effect would not be significant. Indeed, because these sources are exempt on the basis of their annual emissions, there exists an upper limit to the extent to which they may obtain relaxed emission limitations, i.e., to maintain an exemption, the annual emissions of a source may never exceed 5,000 tons per year. For these reasons, the 5,000

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[17] Memorandum from Eric Ginsburg, OAQPS to David Stonefield. "Stratification of SO_2 Point Sources by Size." June 25, 1986.

ton limit passes a *de minimis* test even more clearly than the 65-meter limit included without challenge in the prior version of this rule. Moreover, EPA believes that a large majority of these sources would not be inclined to seek less stringent emission limitations, in part because a substantial portion of them are limited by State and local fuel use rules.

The EPA believes at this time that a *de minimis* size exemption is justified only for sources of SO_2 and that the number of small sources for which emission limitations for other pollutants are a significant concern would not support a similar exemption. The EPA will continue to review the need for such exemptions and, if deemed appropriate, will propose them for review and comment at a later date.

Plume Impaction. The EPA received a number of comments requesting that credit for plume impaction be retained on the grounds that eliminating such credit would have severe impacts on existing sources. Several approaches were offered for overcoming plume impaction effects in modeling to determine emission limitations based on GEP stack height. Generally, these approaches focused on modifying the stack-terrain relationship represented in the models. Several commenters argued along these lines that the court recognized and approved of EPA's attempt to avoid the effects of plume impaction, but only disapproved of EPA's regulatory method in allowing sources to avoid impaction. These commenters argued that the court did not preclude EPA from allowing credit to avoid plume impaction, but only from allowing credit for stack height in excess of GEP; this, it was argued, could be remedied in a way that was consistent with the court decision by incorporating impaction avoidance within the definition of GEP. It was also suggested that EPA give its "interim approval" to the use of certain refined complex terrain models, in particular the Rough Terrain Display Model (RTDM), to

calculate emission limitations for sources affected by changes to the stack height regulation.

Response. The EPA agrees that the court was cognizant of the problem of plume impaction and noted that there was much to recommend EPA's allowance of credit for impaction avoidance. However, the allowance of credit for plume impaction was not remanded to EPA for revision or reconsideration, but was reversed by the court as exceeding EPA's authority.

The EPA does not agree that it would be possible to redefine GEP in a manner that allowed credit for avoiding impaction, since GEP is explicitly defined in terms of preventing excessive concentrations due to downwash, wakes, and eddies. Plume impaction is a phenomenon completely unrelated to downwash and, rather, is a consequence of effluent gases being emitted at an insufficient height to avoid their striking downwind hillsides, cliffs, or mountainsides prior to dilution. Manipulation or "adjustment" of modeling parameters to avoid predicting theoretical plume impaction where actual stacks have been constructed above GEP would be tantamount to granting the same impaction credit that was invalidated by the court. Furthermore, EPA believes that the manipulation of modeling parameters for no other reason than to avoid an undesirable result is technically indefensible.

The EPA is in the process of revising its "Guidelines on Air Quality Models." A number of individuals commenting on the guideline have requested that EPA approve the use of the RTDM model as a preferred technique. Further discussion of this issue can be found in documents associated with EPA's action on the modeling guideline (Docket No. A-80-46). With respect to the revised stack height regulation, EPA has not rejected the use of RTDM. To the extent that appropriate and complete data bases and information on model accuracy

are available, EPA may approve the use of RTDM on a case-by-case basis when executed in accordance with the guideline requirements. Sponsors of RTDM and presently developing more extensive support for broader applications of the model. When such support is received and reviewed by EPA, consideration will be given to allowing more general use of RTDM in regulatory activities such as compliance with the stack height rule.

Timetable for State Implementation. A number of commenters stated that it was not possible to conduct the necessary analyses, prepare and submit revised State rules and source-specific emission limitations within the 9-month timeframe referred to in the November 9 proposal. A variety of alternative schedules were proposed by these commenters for consideration by EPA.

Response. As with EPA's previous allowance of credit for plume impaction, the timetable for preparation and submittal of revised SIP's was not an issue remanded by the court. The EPA is in agreement that these revisions to the stack height regulation will require significant efforts by State and local agencies, individual emission source owners and EPA Regional and Headquarters offices in order to comply within the 9-month timeframe required by section 406(d)(2) of the 1977 Clean Air Act Amendments. It was based on this concern that EPA originally provided a two-step process for States to follow in revising their plans and submitting them to EPA for approval. However, the court found that this effort was explicitly contrary to section 406(d)(2) and ordered EPA to follow the 9-month schedule provided in the Clean Air Act.

New Sources Tied into Pre-1971 Stacks. As indicated earlier, in response to the court opinion, EPA proposed to deny "grandfathered" status to post-1970 sources tying into pre-1971 stacks. Some commenters stated that EPA was in no way prohibited from allowing credit for

new sources ducted into pre-1971 stacks exceeding GEP height. Rather, they indicated that EPA simply had to provide justification for such allowance.

Other commenters indicated general support for EPA's proposal with respect to new sources tying into grandfathered stacks, but suggested that several expansions or clarifications be provided, most notably that, in addition to new and major modified sources, reconstructed sources not be allowed greater than GEP stack height credit when tying into greater than GEP stacks.

Response. In further review of this issue, EPA can find no convincing rationale to allow sources constructed after December 31, 1970, to avoid GEP restrictions simply by ducting their emissions into a stack that is "grandfathered" under section 123. On the contrary, the intent of section 123 to limit credit for stack height in excess of GEP suggests that EPA should not allow credit for such stack height except to honor financial commitments made prior to the end of 1970. Sources in existence after that date should be treated equally under the regulation and not allowed to avoid legitimate control requirements through the use of "grandfathered" stack heights.

Sources undertaking major modification, or reconstruction become subject to additional control requirements under the Clean Air Act and are treated as "new sources" for the purpose of new source review and PSD requirements. EPA finds it appropriate that GEP requirements should be invoked at the time that other requirements for new, modified, or reconstructed sources become applicable.

Summary of Modifications to EPA's Proposal Resulting from Public Comments

Based on comments received during the public comment period, EPA has made a number of revisions to its

proposed regulation in addition to those discussed above. These revisions are summarized below.

Section 51.1(hh)(2)(B)(ii) of the regulation has been clarified to require sources merging gas streams after July 8, 1985 to achieve a net reduction in allowable emissions. This change was made to make it clear that the effects of merging should not be used as a way of achieving compliance with present emission limits and to avoid penalizing sources who are presently emitting at less than allowable levels.

Section 51.1(hh)(2)(B)(iii) allows credit for a source that merged gas streams in a change of operation at the facility prior to July 8, 1985 that included the installation of control equipment or had other sound engineering or economic reasons. Any increase in the emission limitation, or in the previous actual emissions where no emission limitation existed created a presumption that those sound reasons were not present.

Section 51.1(hh)(2)(E) has been added to exclude from the definition of prohibited "dispersion techniques" the use of techniques affecting final exhaust gas plume rise where the resulting total allowable emissions of SO_2 from the facility do not exceed 5,000 tons per year.

Section 51.1(ii)(1) has been revised to specify that the 65 meter *de minimis* height is to be measured, as in other determinations of GEP stack height, from the ground-level elevation at the base of the stack. This does not represent a substantive change in the rule or in its application relative to past practices, but rather a simple clarification.

Section 51.1(ii)(2) has been revised to require that source owners demonstrate that the 2.5H formula was relied on in establishing the emission limitation.

Section 51.1(ii)(3) has been revised as discused elsewhere in this notice to specify that an emission rate

equivalent to NSPS must be met before a source may conduct fluid modeling to justify stack height credit in excess of that permitted by the GEP formulae.

Section 51.1(jj) now defines "nearby" for purposes of conducting field studies or fluid modeling demonstrations as 0.8 km (½ mile), but allows limited consideration of terrain features extending beyond that distance if such features "begin" within 0.8 km, as defined in the regulation.

Section 51.1(kk) has been revised to provide separate discussions of "excessive concentrations" for the separate situations discussed earlier in this preamble. As that discussion makes clear, EPA believes that the differing categories of sources subject to this rule are best addressed by requirements that vary somewhat with those circumstances. This definition embodies that approach.

Section 51.12(k) has been corrected to provide that the provisions of § 51.12(j) shall not apply to *stack heights* in existence before December 31, 1970. The proposal had incorrectly stated that ". . . § 51.12 shall not apply to *stacks* existence. . . ."

Program

This regulation does not limit the physical stack height of any source, or the actual use of dispersion techniques at a source, nor does it require any specific stack height for any source. Instead, it sets limits on the maximum credit for stack height and other dispersion techniques to be used in ambient air modeling for the purpose of setting an emission limitation and calculating the air quality impact of a source. Sources are modeled at their actual physical stack height unless that height exceeds their GEP stack height. The regulation applies to all stacks in existence and all dispersion techniques implemented since December 31, 1970.

State Implementation Plan Requirements

Pursuant to section 406(d)(2) of the Clean Air Act Amendments of 1977, EPA is requiring that all States (1) review and revise, as necessary, their SIP's to include provisions that limit stack height credits and dispersion techniques in accordance with this regulation and (2) review all existing emission limitations to determine whether any of these limitations have been affected by stack height credits above GEP or by any other dispersion techniques. For any limitations that have been so affected, States must prepare revised limitations consistent with their revised SIP's. All SIP revisions and revised emission limitations must be submitted to EPA within 9 months of promulgation of this regulation.

Interim Guidance

In its proposal, EPA stated that it would use the proposed regulation to govern stack height credits during the period before promulgation of the final regulation. The EPA further stated that any stack height credits that are granted based on this interim guidance would be subject to review against the final rules and may need to be revised. Consequently, with these final rules, EPA is requiring that any actions that were taken on stack heights and stack height credits during this interim period be reviewed and revised as needed to be consistent with this regulation.

Regulatory Flexibility Analysis

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the attached rule will not have significant economic impacts on a substantial number of small entities. This rule is structured to apply only to large sources; i.e., those with stacks above 65 meters (213 feet), or with annual SO_2 emissions in excess of 5,000 tons, as further noted in the rule. Based on an

analysis of impacts, electric utility plants and several smelters and pulp and paper mills will be significantly affected by this regulation.

Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a regulatory impact analysis. EPA's analysis of economic impacts predicts a potential cost to emission source owners and operators exceeding $100 million; therefore, this is a major rule under Executive Order 12291. However, due to the promulgation deadline imposed by the court, EPA did not have sufficient time to develop a full analysis of costs and benefits as required by the Executive Order. Consequently, it is not possible to judge the annual effect of this rule on the economy. A preliminary economic impact analysis and subsequent revision were prepared and are in the docket.

For any facility, the air quality and economic impact of the stack height regulation generally depends on the extent to which the actual stack at that facility conforms to GEP stack height. Thus, when the regulation is applied to large sources, i.e., those with stack height greater than GEP and emissions greater than 5,000 tons per year, it will have the potential for producing emission reductions and increased control costs.

A preliminary evaluation of the potential air quality impacts and a cost analysis of the regulation was performed at the time of proposal. The impacts identified were established in isolation of other regulatory requirements. The report predicted a range of impacts, from a "low impact" scenario that presumed that many potentially affected sources would be able to justify their existing stack heights, configurations, and emission limitations to a "high impact" scenario which assumed that all

of the potentially affected sources would be required to reduce their emissions to some degree.

In the development of its final rulemaking action, EPA refined its evaluation of potential impacts, producing revised estimates of the probable costs of the changes to the regulation and expected reductions in SO_2 emissions. As a result of this refinement, EPA estimates that the rule will yield reductions in SO_2 emissions of approximately 1.7 million tons per year. The annualized cost of achieving these reductions will be approximately $750 million, and the capital cost is expected to be approximately $700 million.

This regulation was reviewed by the Office of Management and Budget, and their written comments and any responses are contained in Docket A-83-49.

Judicial Review

The EPA believes that this rule is based on determinations of nationwide scope and effect. Nothing in section 123 limits its applicability to a particular locality, State, or region. Rather, section 123 applies to sources wherever located. Under section 307(b)(1) of the Clean Air Act [42 U.S.C. 7607(b)(1)], judicial review of the actions taken by this notice is available only by the filing of a petition for review in the United States Court of Appeals for the District of Columbia and within 60 days of the date of publication.

List of Subjects in 40 CFR Part 51

Air pollution control, Ozone, Sulfur dioxide, Nitrogen dioxide, Lead, Particulate matter, Hydrocarbons, Carbon monoxide.

Dated: June 27, 1965.

Lee M. Thomas,

Administrator.

PART 51—REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS

Part 51 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 51 continues to read as follows:

Authority: Sec. 110, 301(a), and 123, Clean Air Act as amended (42 U.S.C. 7410, 7601(a) and 7423).

2. Section 51.1 is amended by revising paragraphs (hh), (ii), (jj), and (kk) as follows:

§ 51.1 Definitions.

* * * * *

(hh)(1) "Dispersion technique" means any technique which attempts to affect the concentration of a pollutant in the ambient air by:

(i) Using that portion of a stack which exceeds good engineering practice stack height;

(ii) Varying the rate of emission of a pollutant according to atmospheric conditions or ambient concentrations of that pollutant; or

(iii) Increasing final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, or combining exhaust gases from several existing stacks into one stack; or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise.

(2) The preceding sentence does not include:

(i) The reheating of a gas stream, following use of a pollution control system, for the purpose of returning the gas to the temperature at which it was originally discharged from the facility generating the gas stream;

(ii) The merging of exhaust gas streams where:

(A) The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams;

(B) After July 8, 1983, such merging is part of a change in operation at the facility that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion from the definition of "dispersion techniques" shall apply only to the emission limitation for the pollutant affected by such change in operation; or

(C) Before July 8, 1985, such merging was part of a change in operation at the facility that included the installation of emissions control equipment or was carried out for sound economic or engineering reasons. Where there was an increase in the emission limitation or, in the event that no emission limitation was in existence prior to the merging. an increase in the quantity of pollutants actually emitted prior to the merging, the reviewing agency shall presume that merging was significantly motivated by an intent to gain emissions credit for greater dispersion. Absent a demonstration by the source owner or operator that merging was not significantly motivated by such intent, the reviewing agency shall deny credit for the effects of such merging in calculating the allowable emissions for the source;

(iii) Smoke management in agricultural or silvicultural prescribed burning programs;

(iv) Episodic restrictions on residential woodburning and open burning; or

(v) Techniques under § 51.1(hh)(1)(iii) which increase final exhaust gas plume rise where the resulting allowable emissions of sulfur dioxide from the facility do not exceed 5,000 tons per year.

(ii) "Good engineering practice" (GEP) stack height means the greater of:

(1) 65 meters, measured from the ground-level elevation at the base of the stack;

(2) (i) For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable permits or approvals required under 40 CFR Parts 51 and 52,

$H_g = 2.5H$,

provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation:

(ii) For all other stacks,

$H_g = H + 1.5L$,

where

H_g = good engineering practice stack height, measured from the ground-level elevation at the base of the stack.

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of nearby structure(s)

provided that the EPA, State or local control agency may require the use of a field study or fluid model to verify GEP stack height for the source; or

(3) The height demonstrated by a fluid model or a field study approved by the EPA State or local control agency, which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures or nearby terrain features.

(jj) "Nearby" as used in § 51.1(ii) of this part is defined for a specific structure or terrain feature and

(1) for purposes of applying the formulae provided in § 51.1(ii)(2) means that distance up to five times the lesser of the height or the width dimension of a structure, but not greater than 0.8 km (½ mile), and

(2) for conducting demonstrations under § 51.1(ii)(3) means not greater than 0.8 km (½ mile), except that the portion of a terrain feature may be considered to be nearby which falls within a distance of up to 10 times the maximum height (H_t) of the feature, not to exceed 2 miles if such feature achieves a height (H_t) 0.8 km from the stack that is at least 40 percent of the GEP stack height determined by the formulae provided in § 51.1(ii)(2)(ii) of this part or 26 meters, whichever is greater, as measured from the ground-level elevation at the base of the stack. The height of the structure or terrain feature is measured from the ground-level elevation at the base of the stack.

(kk) "Excessive concentration" is defined for the purpose of determining good engineering practice stack height under § 51.1(ii)(3) and means:

(1) for sources seeking credit for stack height exceeding that established under § 51.1(ii)(2), a maximum ground-level concentration due to emissions from a stack due in whole or part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard. For sources subject to the prevention of significant deterioration program (40 CFR 51.24 and 52.21), an excessive concentration alternatively means a maximum ground-level concentration due to

emissions from a stack due in whole or part to downwash, wakes, or eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum concentration experienced in the absence of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and greater than a prevention of significant deterioration increment. The allowable emission rate to be used in making demonstrations under this part shall be prescribed by the new source performance standard that is applicable to the source category unless the owner or operator demonstrates that this emission rate is infeasible. Where such demonstrations are approved by the authority administering the State implementation plan, an alternative emission rate shall be established in consultation with the source owner or operator;

(2) for sources seeking credit after October 1, 1983, for increases in existing stack heights up to the heights established under § 51.1(ii)(2), either (i) a maximum ground-level concentration due in whole or part to downwash, wakes or eddy effects as provided in paragraph (kk)(1) of this section, except that the emission rate specified by any applicable State implementation plan (or, in the absence of such a limit, the actual emission rate) shall be used, or (ii) the actual presence of a local nuisance caused by the existing stack, as determined by the authority administering the State implementation plan; and

(3) for sources seeking credit after January 12, 1979 for a stack height determined under § 51.1(ii)(2) where the authority administering the State implementation plan requires the use of a field study or fluid model to verify GEP stack height, for sources seeking stack height credit after November 9, 1984 based on the aerodynamic influence of cooling towers, and for sources seeking stack height credit after December 31, 1970 based on the aerodynamic influence of structures not adequately repre-

sented by the equations in § 51.1(ii)(2), a maximum ground-level concentration due in whole or part to downwash, wakes or eddy effects that is at least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects.

3. Section 51.1 is further amended by removing paragraphs (ll) and (mm).

§ 51.12 [Amended]

4. Section 51.12 is amended by removing paragraph (l).

5. Section 51.12(j) is amended by removing "and (l)" from the first sentence.

6. Section 51.12(k) is revised as follows:

(k) The provisions of § 51.12(j) shall not apply to (1) stack heights in existence, or dispersion techniques implemented on or before December 31, 1970, except where pollutants are being emitted from such stacks or using such dispersion techniques by sources, as defined in section 111(a)(3) of the Clean Air Act, which were constructed, or reconstructed, or for which major modifications, as defined in §§ 51.18(j)(1)(v)(a), 51.24(b)(2)(i) and 52.21(b)(2)(i), were carried out after December 31, 1970; or (2) coal-fired steam electric generating units subject to the provisions of Section 118 of the Clean Air Act, which commenced operation before July 1, 1957, and whose stacks were constructed under a construction contract awarded before February 8, 1974.

§ 51.13 [Amended]

7. Section 51.18(l) is amended by removing "and (l)" from the first sentence.

[FR Doc. 85-16094 Filed 7-5-85; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[AD-FRL-2636-2]

Stack Height Regulation

AGENCY: EPA.

ACTION: Proposed rule.

SUMMARY: Section 123 of the Clean Air Act, as amended, requires EPA to promulgate regulations to ensure that the degree of emissions limitation required for the control of any air pollutant under an applicable State implementation plan (SIP) is not affected by that portion of any stack height which exceeds good engineering practice (GEP) or by any other dispersion technique. Regulations to implement Section 123 were proposed on January 12, 1979, at 44 FR 2608 and re-proposed on October 7, 1981, at 46 FR 49814. The final regulation was promulgated on February 8, 1982, at 47 FR 5864.

The final regulation was challenged by the Sierra Club Legal Defense Fund, Inc., Natural Resources Defense Council, Inc., and the Commonwealth of Pennsylvania; on October 11, 1983, the U.S. Court of Appeals for the DC Circuit reversed two portions of the regulation, upheld other portions, and remanded certain other portions to the Agency for reconsideration. *Sierra Club v. EPA*, 719 F.2d 436 (DC Cir., 1983), *cert. denied*, 104 S. Ct. 3571 (July 2, 1984).

Today's action proposes to revise the Agency's stack height regulation by adding additional provisions and by modifying or rescinding existing provisions as necessary to comply with the court's opinion. Today's action also requests comments on alternative methods of implementing Section 123 in light of the DC Circuit Court

mandate. When finalized, this action will require that SIP's be revised to incorporate and implement specific provisions necessary to carry out the requirements contained in Section 123 of the Clean Air Act.

DATES: Comments must be received by the Central Docket Section no later than 4 p.m. (EST) on December 10, 1984. Because the mandate issued by the court requires that EPA promulgate a final regulation not later than January 18, 1985, it will not be possible to extend this comment period beyond the 30 days provided in this notice.

ADDRESS: All comments must be submitted (in triplicate if possible) to: Central Docket Section (LE-131), EPA, Attention: Docket Number A-83-49, 401 M Street, SW., Washington, DC 20460.

FOR FURTHER INFORMATION CONTACT: Eric O. Ginsburg, MD-15, Office of Air Quality Planning and Standards, EPA, Research Triangle Park, North Carolina 27711, telephone (919) 541-5540.

SUPPLEMENTARY INFORMATION:

Docket Statement

All pertinent information concerning the development of this regulation is included in Docket Number A-83-49. The docket is open for public inspection between the hours of 8 a.m. and 4 p.m., Monday through Friday, at the EPA Central Docket Section, West Tower Lobby, Gallery One, 401 M Street, SW., Washington, DC. Background documents normally available to the public, such as Federal Register notices and Congressional reports, are not included in the docket. A reasonable fee may be charged for copying documents.

Background

Subject

The problem of air pollution can be approached in either of two ways: through reliance on a technology-

based program that mandates specific control requirements (either control equipment or control efficiencies) irrespective of ambient pollutant concentrations, or through an air quality management-based program that relies on ambient air quality levels to determine the allowable rates of emissions control. The Clean Air Act incorporates aspects of both approaches, but the SIP program uses the air quality management approach to establish emission limitations for sources. Implicitly, this approach acknowledges and is based on the normal dispersion of pollutants from their points of origin into the atmosphere.

There are two general methods for preventing violations of the national ambient air quality standards (NAAQS) and prevention of significant deterioration (PSD) increments. Continuous emission controls reduce the quantity, rate, or concentrations of pollutants released into the atmosphere from a source. In contrast, dispersion techniques rely on the dispersive effects of the atmosphere to carry pollutant emissions away from the source and to prevent high concentrations of pollutants near the source. Section 123 of the Clean Air Act limits the use of dispersion techniques by poll :tion sources to meet the NAAQS and PSD increments.[1]

Tall stacks, manipulation of exhaust gas parameters, and intermittent or supplemental control systems (ICS or SCS) are the basic types of dispersion techniques. Tall stacks enhance dispersion by releasing pollutants into the air at elevations high above ground level, thereby providing greater mixing of pollutants into the atmosphere. The result is to dilute the pollutant levels and reduce the concentrations of the pollutant at ground level, without reducing the total amount of pollution

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[1] See Section 110(a)(2)(B), 123, 302(k), and 302(m) of the Act, 42 U.S.C. 7410(a)(2)(B), 7423, 7802(k), and 7802(m). For additional discussion of the Act's prohibition of the use of dispersion techniques, see 44 FR 2806-2810.

released. Manipulation of exhaust gas parameters increases the plume rise from the source, which increases the effective release height of the pollutant. Intermittent and supplemental control systems vary a source's rate of emissions to take advantage of meteorological conditions. When automatic conditions do not favor dispersion and a standard may be violated, the source temporarily reduces its pollutant emissions. When conditions favor rapid dispersion, the source emits pollutants at higher rates.

Use of dispersion techniques in lieu of constant emission controls results in additional atmospheric loadings of pollutants. The use of tall stacks and increased plume rise increases the possibility that pollution will travel long distances before it reaches the ground.

Although overreliance on dispersion techniques may produce adverse effects, use of the dispersive properties of the atmosphere has long been an important factor in air pollution control. For example, some stack height is needed to prevent excessive concentrations of pollutants near a source, which are created by airflow disruptions caused by structures, terrain features, and ground-level meteorological phenomena. Such disruptions cause downwash, wakes, and eddies which can force a plume rapidly to the ground, resulting in excessive concentrations of pollutants near the source. As discussed below, the Clean Air Act recognizes these facts and responds by allowing sources to calculate their emission limitations with explicit consideration of that portion of a source's stack height that is needed to ensure that excessive concentrations due to downwash will not be created near the source. This height is called "good engineering practice" (GEP) stack height.

Statute

Section 123, which was added to the Clean Air Act by the 1977 Amendments, regulates the manner in which

techniques for dispersion of pollutants from a source may be considered in setting emission limitations. Specifically, Section 123 requires that the degree of emission limitation shall not be affected by that portion of a stack which exceeds GEP or by "any other dispersion technique." It defines GEP, with respect to stack heights as:

> the height necessary to insure that emissions from the stack do no result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles . . . [Section 123(c)].

Section 123 further provides that GEP stack height shall not exceed two and one-half times the height of the source unless a demonstration is performed justifying a higher stack. In addition, Section 123 provides that the Administrator shall regulate only stack height credits, rather than actual stack heights.[2]

With respect to "other dispersion techniques" for which emission limitation credit is restricted, the statute is less specific. It states only that the term shall include ICS or SCS. Regulations proposed at 49 FR 37542, September 24, 1984, would limit such systems for which credit may be allowed to those implemented prior to 1971.

Thus the statute delegates to the Administrator the responsibility for defining key phrases in Section 123: "excessive concentrations," "nearby," with respect to both structures and terrain obstacles, and "other dispersion techniques." It also requires the Administrator to define what constitutes an adequate demonstration justifying stack height credits in excess of 2.5 times the height of a source.

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[2] The credit is the height assigned to the stack, irrespective of higher actual height, in calculating a source's emission limitations through the use of dispersion modeling.

Rulemaking

On January 12, 1979 (44 FR 2608), EPA published a notice proposing limitations on stack height credit and other dispersion techniques. The notice proposed specific rules to be used in determining GEP stack height for any source and specific requirements for SIP's. EPA provided an extended period for the submission of public comments on this proposed regulation. EPA held a public hearing on May 31, 1979, followed by a 30-day period for submission of additional comments (44 FR 24329, April 25, 1979). EPA later requested comments on additional technical information (44 FR 40359, July 11, 1979; and 46 FR 24596, May 1, 1981). EPA then reproposed the regulation with changes made in response to the comments received (46 FR 49814. October 7, 1981). Finally, EPA promulgated the final regulation on February 8, 1982, at 47 FR 5864. Information concerning the development of the regulation was included in Docket Number A-79-01 and is available for inspection at the EPA Central Docket Section.

Litigation

Petitions for review of the 1982 regulation were filed in the D.C. Circuit within the statutory time period. In addition, petitions for reconsideration of the 1982 rule were filed by the Sierra Club Legal Defense Fund, Inc. and the Natural Resources Defense Council, Inc., on April 6, 1982, and by the Commonwealth of Pennsylvania on April 20, 1982. EPA published a notice denying these petitions at 47 FR 31321 (July 19, 1982).

Petitions to review the denial were also filed and consolidated with the previous petitions in the U.S. Court of Appeals for the D.C. Circuit. On October 11, 1983, the court issued its decision ordering EPA to reconsider portions of the stack height regulation, reversing certain portions and upholding other portions. The following is a summary of the court decision.

Plume Impaction

Sections 51.1(ll) and 51.12(l) of the regulation addressed pollutant concentrations estimated to occur when a plume interacts with elevated terrain, by allowing an increase in stack height credit to avoid excessive concentrations under such circumstances, and by allowing the Agency to consider increased stack height to avoid plume impaction in setting the degree of emission limitation required for sources in hilly areas. In reviewing this provision, the court observed that there was "* * * much to commend EPA's action from a policy perspective. Without EPA's plume impaction provisions, the law discriminates harshly against utilities located in mountainous terrain, for it will require them to emit for less than their flatland counterparts" (*Sierra Club* v. *EPA 719 F.2d at 455*). However the court also held that "In enacting Section 123, Congress clearly did not intend to legislate geographic equality. In fact, it specifically expected that the tall stacks provision would have a disproportionately heavy impact on polluters in mountain areas" (slip op. 37) (Id.). Accordingly, the court ruled that Section 123 did not permit EPA to make allowances for plume impaction in setting source emission limitations and reversed these portions of the stack height regulation.

Timetable for State Implementation

In the preamble to the final regulation, EPA provided a two-stage process for State implementation of the regulation. This process allowed 9 months for the drafting and submission of rules limiting stack height credit, providing 4 months for EPA review and approval, followed by an additional 9 months for States to revise their emission limitations to be consistent with the State rules. The court found the resulting 22-month period between promulgation of EPA's regulations and submission of revised emission limitations to be contrary to section

406(d)(2) of the Clean Air Act Amendments of 1977 and reversed the Agency's two-stage plan.

Excessive Concentrations

In § 51.1(kk) of the regulation, EPA defined excessive concentrations, based on traditional engineering practice, as a 40-percent increase in pollutant concentrations due to downwash, wakes, and eddy effects caused by structures or terrain features over that which would occur in the absence of such downwash, wakes, or eddy effects. While the court did not question the validity of traditional engineering practice, it held that EPA erred in failing to establish a correlation for the determination of excessive concentrations in a manner that was directly responsive to concerns for public health and welfare under the Clean Air Act. For this reason, the court remanded the definition of excessive concentrations to EPA with instructions to incorporate such a health and welfare related consideration.

Definition of Dispersion Techniques

In § 51.1(hh) of the stack height regulation, EPA defined "dispersion techniques" as those techniques which attempt to affect the concentration of a pollutant in the ambient air by using that porion of a stack exceeding GEP, by varying emission rates according to atmospheric conditions or ambient concentrations of a pollutant, or by addition of a fan or reheater to obtain a less stringent emission limitation. The court found that this definition was too narrow because it may have excluded some techniques that should have been prohibited. As a result, the court ordered EPA to develop broader rules disallowing credit for all dispersion techniques as the term is used in Section 123 of the Clean Air Act. In discussing the different options available to the Agency, the court specifically noted that EPA could either provide a more comprehensive list of prohibited techniques

or could define the term broadly, listing specific practices that were to be excluded from that definition.

Automatic Credit for Stack Height Increases up to Formula Height

The definition of GEP stack height contained in § 51.1(ii) established several bases for determining GEP stack height. The first approach established a *de minimis* stack height up to which stacks would be allowed credit with no additional demonstrations required. The second approach provided formulae that calculated GEP stack height based on the dimensions of nearby structures. The third approach based GEP stack height determinations on fluid modeling analyses or field studies of downwash, wakes, and eddy effects due to nearby structures or terrain obstacles. In its decision, the court found that EPA had not sufficiently established the adequacy of the formulae, holding that there appeared to be a reasonable possibility that the formulae provides more stack height credit in certain situations than was necessary to avoid excessive concentrations due to downwash, wakes, or eddy effects. Furthermore, the court held that the regulation allowed sources to increase the height of their existing stacks up to that allowed by the formulae without a demonstration that such increase is actually needed for the purpose of avoiding excessive concentrations due to downwash, wakes, or eddy effects. For these reasons, the court remanded the definition of GEP stack height to EPA to consider how well the formulae protect against excessive concentrations and whether they are sufficiently reliable to preclude the need for demonstrations to justify increasing the height of existing stacks.

The Allowance of Credit for New Sources Tied into Old Stacks Exceeding GEP Height

Section 51.12(k) of the regulation provided grandfathering protection from GEP requirements for stacks

in existence on or prior to December 31, 1970. As written, the regulation did not prohibit sources constructed after December 31, 1970, from receiving credit for tying into grandfathered stacks. In the absence of an explanation from the Agency for not including such a prohibition, the court remanded this issue to EPA for justification.

Absence of a Specific "Nearby" Limitation for GEP Demonstrations

The regulation defines "nearby" for the purposes of application of the GEP stack height formulae as five times the lesser of either the height or projected width of the structure causing downwash, wakes, or eddy effects not to exceed one-half mile. No such distance limitation was placed on structures or terrain features in order for their effects to be considered in field studies and fluid modeling demonstrations. While the court agreed that placing such a limitation on terrain features and structures for the purpose of considering their effects in fluid modeling was clearly arbitrary, the court also held that such arbitrariness was apparently intended by Congress. Consequently, the court remanded this issue to EPA to apply the same "nearby" limitation to field studies and fluid modeling demonstrations.

Reliance on the 2.5H Formula

Section 51.1(ii)(2) of the regulation provided two separate formulae for the calculation of GEP stack height. For sources constructed on or before January 12, 1979, this formula established GEP stack height as 2.5 times the height of the source or other nearby structure (2.5H). Sources constructed after that date were subject to the second formula which specified that GEP stack height was equal to the height of the source or other nearby structure plus 1.5 times the height or width of that structure, whichever is the lesser (H + 1.5L).

In reviewing these formulae, the court held that sources constructed on or before January 12, 1979 should not automatically receive the full stack height credit provided by the 2.5H formula, but should be required to demonstrate that the 2.5H formula was actually relied upon in the design of the stack in order to prevent downwash, wakes, and eddy effects caused by the nearby structure. Consequently, these provisions were remanded to EPA to take actual reliance on the 2.5H formula into account.

Plume Rise, Exclusion of Flares, and Definition of "In Existence"

Three other provisions of the regulation were challenged in the Sierra Club suit: The failure to consider plume rise in the establishment of GEP formulae, the exclusion of flares from the definition of "stack," and EPA's definition of "stacks in existence prior to December 31, 1970." In its review of these provisions, the court held that EPA had acted properly and upheld these portions of the regulation.

Other provisions of the stack height regulation, such as the *de minimis* stack height established under § 51.1(ii)(1), were not challenged in the suit and thus remain in effect.

Administrative Proceedings Subsequent to the Court Decision

On December 19, 1983, EPA held a public meeting to take comments to assist the Agency in implementing the mandate of the court. This meeting was announced in the Federal Register on December 8, 1983, at 48 FR 54999. Comments received by EPA are included in Docket Number A-83-49 and are available for review in EPA's Central Docket Section. On February 28, 1984, a group of affected industries filed a petition for a writ of certiorari with the U.S. Supreme Court. While the

petition was pending before the court, the mandate from the U.S. Court of Appeals was automatically stayed. On July 2, 1984, the Supreme Court denied the petition (104 S.Ct. 3571), and on July 18, 1984, a mandate was formally issued by the U.S. Court of Appeals. This mandate implements the court's decision and requires the Agency to promulgate revisions to the stack height regulation not later than January 18, 1985.

Documents

In conjunction with the 1982 regulation, EPA developed several technical and guidance documents. These served as background information for the regulation, and all were included in Docket Number A-79-01. The following documents have been placed in the National Technical Information Service (NTIS) system and may be obtained by contacting NTIS at 5285 Port Royal Road, Springfield, Virginia 22161.

(1) "Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations)," July 1981, EPA, Office of Air Quality Planning and Standards, EPA-450/4-80-023 (NTIS PB82 145301).

(2) "Guideline for Use of Fluid Modeling to Determine Good Engineering Stack Height," July 1981, EPA, Office of Air Quality Planning and Standards, EPA-450/4-81-003 (NTIS PB82 145327).

(3) "Guideline for Fluid Modeling of Atmospheric Diffusion," April 1981, EPA, Environmental Sciences Research Laboratory, EPA-600/8-81-009 (NTIS PB81 201410).

In developing the revisions being proposed today, the Agency also relied on the following additional reference materials. These served as background information for the regulation. Copies of the documents are available in

Docket Number A-83-49. Copies of EPA documents may also be available, depending on supply, from the EPA contact identified above.

(1) Draft "Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulation), (With Addenda)," November 1984.

(2) "Economic Impact Assessment for the Proposed Revisions to the EPA Stack Height Regulation," Draft, November 1984.

(3) "Determination of Good Engineering Practice Stack Height-A Fluid Model Demonstration Study for a Power Plant," April 1983, EPA. Environmental Sciences Research Laboratory, EPA-600/3-83-024 (NTIS PB 83207407).

Program Overview

Program

The revision proposed today redefines "excessive concentrations," "dispersion techniques," "Nearby," and certain other important concepts. It also modifies some of the bases for determining the GEP stack height for all sources to which this regulation applies.

This regulation does not limit the physical stack height of any source, or the actual use of dispersion techniques at a source, nor does it require any specific stack height for any source. Instead, it sets limits on the maximum credit for stack height and other dispersion techniques to be used in ambient air modeling for the purpose of setting an emission limitation and calculating the air quality impact of a source. Sources are modeled at their actual physical stack height unless that height exceeds their GEP stack height. The regulation applies to all stacks in existence and all dispersion techniques implemented since December 31, 1970.

Excessive Concentrations.

EPA is proposing two alternative approaches to this problem. First, pursuant to the court's opinion, EPA invites comment on whether the approach adopted in 1982, defining "excessive concentrations" in keeping with historic engineering practice, as a 40 percent increase over the levels in the absence of a downwash creating obstacle, in fact protects against dangers to health and welfare.

Second, in the event such a showing cannot be made, EPA is proposing a two-part definition of "excessive concentration." The proposed regulation requires that the downwash, wakes, or eddy effects induced by nearby structures or terrain features results in an increase in ground-level pollutant concentrations that:

(a) Causes or contributes to an exceedance[a] of a NAAQS or applicable PSD increment; and

(b) Is at least 40 percent in excess of concentrations projected to occur in the absence of such structures or terrain features.

When a flow of air contacts a structure or terrain feature, a region of turbulent air is produced downwind of the structure with a high that is approximately 2.5 times the height of the obstacle. A plume entering this region, i.e., one emitted from a stack that does not exceed the height of the region, is rapidly brought to earth, with a resulting substantial increase in ground-level concentrations.

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[a] The term "exceedance" means a value in excess of the standard or PSD increment and should not be confused with "violation," which is defined separately for each pollutant. For additional information on the subject of exceedances versus violations. 40 CFR Part 50, and accompaning appendices further describes the NAAQS, sampling and determination methods. PSD requirements and the increments are described in 40 CFR 51.24 and 52.21.

Because the NAAQS represent pollutant concentrations which the Agency has previously determined to result in adverse health and welfare effects, the inclusion of the exceedance of a NAAQS in the definition of "excessive concentrations" provides a straightforward response to the court's directive. Further information on health and welfare effects is contained in the criteria documents prepared in conjunction with the NAAQS for each pollutant.

The basis for inclusion of the remaining PSD increments in the definition of "excessive concentrations" is less obvious, but is derived from the congressional intent expressed in Section 160(1) of the Clean Air Act. EPA is not proposing to find that adverse health or welfare effects occur at ambient concentrations equivalent to the PSD increments, nor does the Agency believe that it is necessary to do so in order to adequately respond to the requirement established by the court. In its decision, the court ordered EPA to develop a standard that is "responsive to the concern for health and welfare that motivated Congress to establish the downwash exception."[4] In enacting Part C of the 1977 Clean Air Act Amendments, Congress itself stated that the purposes of this part are "(1) to protect public health and welfare from any actual or potential adverse effect which the Administrator's judgment may reasonably be anticipated to occur from air pollution . . . notwithstanding attainment and maintenance of all national ambient air quality standards."[5] Consequently, EPA finds this determination by Congress to provide sufficient justification for inclusion of PSD increments, consistent with the court's mandate.

In its 1981 reproposal and 1982 promulgation, EPA expressed concerns about comparing the short-term,

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[4] *Sierra Club* v. *EPA*, 719 F.2d 438 (D.C. Cir. 1983), page 28.

[5] Clean Air Act (42 U.S.C. 1857 et seq.). Park C. Section 180(1).

poorly-diluted pollutant concentrations that occur during downwash with the NAAQS and PSD increments, which represent concentrations measured over somewhat longer periods of time and after greater opportunity for dispersion. *See* 46 FR 49819 (October 7, 1981). These concerns still exist. The court's decision, however, requires EPA to find some way to link downwash-induced concentrations with adverse impacts on health and welfare. EPA's criteria documents show that pollutants affect health and welfare at the levels of the NAAQS: the statute and legislative history state that the PSD increments were intended to protect health and welfare. EPA, in the absence of other acceptable alternatives, believes that the NAAQS and PSD increments may constitute acceptable indicators for health and welfare affects under downwash conditions. Since, however, the NAAQS and PSD increments may not be ideal tools for measuring the effects of downwash, EPA particularly invites comments on the other approaches to resolving this problem.

Requiring a source to show only that concentrations during downwash would exceed a NAAQS or PSD increment would not demonstrate that the downwash is significant enough to warrant stack height credit. Background pollutant levels or meteorological conditions might allow a source whose stacks emit only a few micrograms of a pollutant to cause or contribute to an exceedance. To ensure that sources obtain stack height credit only when downwash causes a significant increases in ground level pollutant concentrations, the proposed regulation retains that portion of the 1982 regulation requiring that pollutant concentrations under downwash conditions be at least 40 percent greater in the presence of the obstacle than they would be without the obstacle.

As explained in the technical support document, researchers have found that a stack 2.5 times the height of a nearby structure reduces the effects of downwash

produced by the structure so that it increases ground level pollutant concentrations by only 20 to 80 percent (extremely wide buildings and buildings oriented at 45° angle to the wind were observed to produce increases approaching 80 percent). Consequently, EPA believes it is prudent to set its change in concentration requirements somewhere below this maximum. EPA selected 40 percent as a reasonably conservative choice from the middle of the range of impacts observed. Moreover, the engineering community has traditionally accepted the increases in concentration due to downwash that were associated with the application of the 2.5H rule. These increases have been found to be in the range of 40 percent.

It was not necessary under the previous definition of "excessive concentrations" to establish a source emission limitation prior to conducting fluid modeling because the definition required only that sources show an increase in concentration due to downwash, wakes, or eddy effects. With the revised definition, it will be necessary to specify an emission rate in the fluid model, in order to determine whether a NAAQS or PSD increment is being exceeded. Consequently, the Agency will require in its technical support document that the emission limitation be established based on either: (1) The existing, approved emission limit; (2) any applicable technology-based emission limit, such as the new source performance standards (NSPS); or (3) the emission limit that would result from the use of GEP formula stack height, whichever is applicable to the source being modeled. Once the emission limitation is identified, fluid modeling may consider the actual downwash, wake, and eddy effects of nearby terrain features and structures on ground level concentrations. Sources will then be allowed to calculate stack height credit based on that height needed to eliminate excessive concentrations caused by such effects.

Definition of GEP Stack Height

The most important issue in this section of the regulations is the use of traditional (2.5H) and refined (H+ 1.5L) formula for calculating GEP stack height. The court, in remanding this issue to EPA for further consideration, did not reject the use of a formula, but directed that the formula be reevaluated in light of any revised definition of excessive concentrations. The court also acknowledged elsewhere in its opinion that the formula would necessarily be a somewhat rough rule of thumb. The Agency believes that its reevaluation satisfies the remand and clearly demonstrates the continuing validity of both formula, with the exceptions noted below.

EPA is relying on the following considerations as the bases for its belief in the validity of the formula:

1. In response to the Court's questions concerning the accuracy of the formulae, EPA has reviewed fluid modeling studies for five separate power plants known to have predicted ambient concentrations as well as changes in concentrations due to downwash and found that, in four cases, the concentration predicted to occur with GEP formula stack heights exceeded both the 40 percent and the NAAQS criteria. When the 40 percent criterion was just met (i.e., by increasing stack height), further reductions in emissions would still be required in order to eliminate NAAQS exceedances under downwash conditions in three of these cases. The fifth case demonstrated a GEP stack height lower than that derived from the formula; however, the demonstrated GEP height was less than 10 percent lower than the formula height. This difference was not sufficient to significantly affect the source emission limitation. Generally a change in stack height credit of roughly 10 percent is not likely to significantly change the final emission limitation.

EPA also conducted several modeling evercises using the Industrial Source Complex Model in an effort to bet-

ter define the reliability of the formula. The results of this modeling indicated that, when emission limitations are calculated based on controlling atmospheric stabilities other than downwash, and using a GEP formula stack, the predicted concentrations in all cases were greater than or equal to the NAAQS under downwash conditions.

2. EPA has found that the formula represents, not an average, but a lower limit, of the height needed to avoid the 40-percent increase in pollutant concentrations that the engineering community has traditionally regarded as excessive. Rather than being statistically distributed uniformly around the formula, the height needed to limit the impact of downwash to a 40-percent increase in concentration tends to be skewed toward greater than formula height. The reason for this skewed distribution is that the formula was developed based on the height needed to reduce downwash caused by a simple structure, with wind direction perpendicular to the side of the structure.

The original 2.5H formula was based on demonstrations of the height needed to avoid excessive concentrations that resulted from downwash caused by a cubic structure. The Agency subsequently reexamined that engineering rule and noted that it tended to overpredict the height needed to limit the impact of downwash when building heights exceeded their widths. EPA responded to this tendency by developing a formula (H+1.5L) that more conservatively based stack height on the lesser of either the height or width of the structure producing downwash, wakes, or eddy effects. The Agency has more recently examined fluid modeling studies carried out subsequent to the development of the revised formula, and finds that these studies further corroborate the findings on which the H+1.5L formula was based.

Structures more complex than simple cube- or block-shaped structures produce more complicated air disturb-

ance patterns, which will increase, rather than decrease, ground-level concentrations due to downwash. EPA guidance on the use of the formula requires that the formula be applied to complex structures in a conservative fashion. Sources may not base formula stack height on the total dimensions of complex structures [such as tiered buildings) at their maximum heights and widths but, as described further in the technical support document, must restrict the dimensions that are used in a way that may underestimate the aerodynamic effects of the complex structures.

Finally, when buildings are positioned at an angle to the wind direction, their effective width is increased beyond that on which the formula is based. An angled position may result in an increase in downwash over that which occurs when the building is perpendicular to wind direction. Because the formula is based on studies that assumed a perpendicular wind direction, the formula tends to underpredict the height needed to reduce the impact of downwash to a 40-percent increase.

3. In the legislative history of Section 123, Congress clearly indicated that it expected the traditional 2.5H formula would accurately predict stack height credit in the majority of cases. The facts outlined above corroborate Congress' expectations by showing that, for most sources, the formula provides a conservative prediction of the amount of stack height needed to avoid excessive concentrations. Consequently, Congress' endorsement provides additional support for the use of the formulae.

4. In addition to the data and discussion presented above, EPA views the formulae as essential for the operation of the Clean Air Act's air quality programs. The Agency is presently aware of fewer than 10 fluid modeling facilities in the United States that may be considered available to conduct the necessary studies to establish

GEP stack height.[6] Given that it takes up to 3 months to conduct a fluid modeling study, EPA could expect States and sources to model at most 30 to 40 sources in a year. Since this proposal may affect 400 or more sources, it would not be possible to model all sources—or even a significant fraction of all sources—within the 9-month deadline for plan revisions required by the Clean Air Act and the court's decision.

The limitations on fluid modeling compel EPA to use some type of stack height formula. Despite the limited amount of data that exist to support the 2.5H and H + 1.5L formulae, EPA has found even less to support any alternative formula or screening method.

5. EPA sometimes found it necessary to use a formula when performing fluid modeling to determine GEP height. To determine whether downwash creates excessive concentrations, the modeler must specify an emission rate. If not already established as a part of the SIP or dictated by technology-based standards, such as NSPS, however, the modeler must perform dispersion modeling to determine an appropriate emission rate; this effort requires that a stack height be specified. Since the modeler cannot use fluid modeling until he sets an emission limitation, he must find an alternative method for estimating the stack height. The formula is currently the best starting point.

In light of all these considerations, EPA is proposing to continue to allow use of the traditional and refined formulae to set stack height credits. EPA, however, is also proposing to place two new restrictions on the use of the formulae. The first restriction reflects the only two cases where EPA found that formulae may produce stack height credits greater than needed to reduce changes in

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[6] A listing of fluid modeling facilities of which EPA is presently aware is included in the docket this listing should not be construed as an endorsement of any facility, nor a rejection of any other qualified facilities which may exist.

concentrations to 40 percent: (1) "Porous" structures, such as the unenclosed metal supporting framework or "lattice" used in some refineries and powerplants; and (2) structures whose shapes are aerodynamically smoother than the block-shaped structure used in the development of the formula. The most common examples of such structures are hyperbolic cooling towers, and domed, rounded, or tapered buildings. In such cases, the wind disturbance patterns around the structures are not as well understood, and may not be as great as in the case of simple block structures. Presently, insufficient data exist, and the state of the analytical art is not yet advanced sufficiently to enable EPA to establish an engineering formula to calculate GEP stack height for these structures. While such a formula may be developed in the future, the Agency is currently proposing to require, in its revised GEP guideline document, that sources seeking credit for the effects of porous structures or structures that are domed, tapered or rounded, as in the examples noted above, conduct field studies or fluid modeling demonstrations to determine GEP stack height.

The Agency acknowledges that the effect of this requirement may be to: (1) Encourage owners of porous structures to enclose them, rather than conduct fluid modeling that may result in more restrictive emission limitations; and (2) discourage owners from constructing more aerodynamically smooth structures that could reduce the stack height needed to avoid excessive concentrations due to downwash, wakes and eddy effects. However, allowing use of the formula by the owners of such porous or aerodynamically smooth structures could result in the granting of more stack height credit than is needed to avoid excessive concentrations.

Also, EPA is proposing to revise § 51.1(ii)(2)(ii) of the regulation by providing that, although sources may generally receive formula stack height credit, EPA, the State or local air pollution control agency may require

the use of a field study or fluid model if it believes that a further demonstration of GEP stack height is needed.

In light of the Agency's conclusions about the validity of the formula, and the new authority for air pollution control agencies to require specific demonstrations, EPA also believes that it has adequately responded to the court's directive to consider the need for sources to demonstate the need to raise existing stacks to formula height. Consequently, no such demonstrations will be required unless specifically requested, as provided in the previous paragraph.

Finally, EPA is proposing to revise its restrictions on the use of the traditional formula. EPA is proposing to revise § 51.1(ii)(2)(i) of the regulation to require that, in order for stacks in existence on or before January 12, 1979 to receive stack height credit under the 2.5H formula, source owners demonstrate to EPA that this formula was actually relied on in the design of the stack.

EPA would consider contemporaneous documentary evidence, such as original engineering calcaulations and facility design plans attesting that the 2.5H equation was, in fact, used as the basis for the design of the facility stack, or that the facility relied on EPA guidance which based GEP stack height on the 2.5H formula. In addition, EPA is considering an alternative that would allow the submission of reconstructed documentation, such as affidavits from individuals and engineering firms responsible for the original design of the facility.

Definition of Nearby

EPA is also proposing to revise § 51.1(ii)(3) to limit the consideration of downwash, wakes, and eddy effects of terrain features only to those features that can be classified as being "nearby" as that term is defined in § 51.1

(jj). In proposing this change, the Agency is specifically requesting comments on several aspects of the distance limitation.

For the purposes of demonstrations under § 51.1(ii)(3), terrain features would be considered to be "nearby" if such features fall within a distance of not more than 0.8 km (½ mile). Those portions of terrain falling beyond 0.8 km may be considered if they achieve at a distance of 0.8 km a height greater than or equal to 40 percent of the GEP stack height(i.e., 1/2.5H) calculated using the formula § 51.1(ii)(2)(ii). The extent to which such features may be considered is limited to those portions which fall within 10 times the maximum height of the featuues, not to exceed two miles.

The rationale for the 40-percent minimum height is that EPA presently allows consideration of structures up to such heights in the use of formula. The rationale for the maximum limit is as follows:

1. EPA conservatively estimates that the wake region proposed by a terrain feature extends downwind approximately 10 times the height of the feature. Current research suggests that this distance can be anywhere between 10 and 15 times the height of the feature.

2. The court indicated the need for a constrained distance limitation and the Agency does not believe that unlimited consideration of complex terrain in GEP determinations is warranted by the statute as indicated by the judicial opinion.

3. The downwash effects of terrain features exceeding 1200 feet within a distance of approximately 2¼ miles (or 10 times 1200) cannot be overcome, in a practical sense, by construction of a GEP stack. Consequently, greater downwash effects would have to be addressed through reduced emissions.

This provision does not by any means guarantee that such terrain features will, in fact, produce downwash in the fluid model which will justify greater stack height. Rather, it limits the extent to which terrain effects may be considered in fluid modeling.

EPA is proposing to select one of the two options below for applying the distance limitation to new sources versus those sources in existence prior to the date of publication of this notice of proposed rulemaking. Option 1 uses the approach described above for new and existing sources. In Option 2, the Agency is considering an approach that differentiates between stacks in existence at the time this revision to the regulation is proposed and stacks constructed at a later date. Under this option, existing sources would use the approach described above. However, stacks constructed after the date of promulgation of this rule would be modeled using only those portions of terrain features which fall within 0.8 km (½ mile) of the stack. EPA's rationale for this approach is based on its opinion that future sources have greater flexibility to locate in less complex terrain and that, under such circumstances, the Agency should be somewhat more restrictive in allowing stack height credit for terrain effects.

Additionally, the Agency must decide how fluid modeling of the effects of terrain features should be conducted. In preliminary investigations, three general approaches have emerged, and are summarized here (further information on these approaches is included in the technical support document for this proposed rulemaking).

a. Establishing a model baseline that assumes no influencing terrain or structure, i.e., assuming a flat plane up and downwind of the stack; to evaluate the effects of structures and terrain features, a second model run would be conducted by inserting all nearby structures and terrain features, but "cutting off" all structures and terrain beyond the distance limitation such that it appears as a smooth and level plane in the model.

b. Establishing a model baseline in the same manner as the first approach; to evaluate the effects of nearby structures and terrain, the features would be inserted into the model, smoothing and sloping the terrain beyond the distance limitation downward into a single oblique plane.

c. Establishing a model baseline by initially representing in the model all relevant terrain features beyond a distance of 0.8 km for new sources or, for existing sources, 10H, not to exceed 2 miles, but excluding the nearby features, i.e., smoothing and sloping those features falling within the distance limit to minimize their effects; to evaluate the effects of nearby terrain, these latter features would then be inserted into the model, and the resulting concentrations compared to the baseline.

The Agency is presently inclined to adopt the third approach as most accurately distinguishing between the effects of near and far terrain features, but is requesting further comment on the appropriateness of each approach. Additional information on the approaches is contained in the technical support document to this proposal.

In proposing these revisions to the definition of "nearby," EPA recognizes that distance limitations are somewhat arbitrary in nature, but feels that the proposal best comports with the instructions given by the court. The Agency intends to continue to examine the effects of terrain on atmospheric downwash, and the relationship between terrain-induced downwash effects and those produced by structures. In this regard, EPA solicits additional information on terrain-induced downwash, and alternative approaches to satisfying the court remand on this issue.

Definition of Dispersion Techniques

EPA is proposing to revise the definition of "dispersion techniques" to include any practice intended to increase

final plume rise. The reason for this inclusion is that, regardless of actual stack height, increasing final plume rise can have the result of increasing the effective release height of pollutants into the atmosphere. A greater effective release height, in turn, can lead to less stringent emission limitations and greater dispersion of pollutants than is justified to avoid excessive concentrations due to downwash, wakes, and eddy effects.

EPA is requesting comment on defining the circumstances under which the combining of gas steams should not be considered a prohibited dispersion technique. The Agency is proposing to allow sources to take credit for such merging of gas streams: (1) Where the facility was originally designed and constructed with merged gas streams, or (2) where it is associated with a change in operation at a facility that includes the installation of pollution control equipment that results in a net reduction in total pollutant emissions.

Sources may combine stacks, or exhaust gas streams in order to use more effective control technologies, which can yield significant reductions in pollutant emissions. A prime example of this is the combining of stacks for the purpose of installing an electrostatic precipitator. EPA is proposing to allow such a source to perform modeling to establish its TSP emission limitation in a way that considers the plume enhancement effects of combining stacks. However, if no additional SO_2 reductions are produced through the change in operation, EPA is proposing that modeling to set the SO_2 emission limitation not be allowed to consider the plume enhancement effect.

Facilities have been traditionally designed, as a standard engineering practice, with multiple flue stacks, or with several emission points ducted into a common stack. Existing facilities, in the process of upgrading their equipment, frequently resort to combining of stacks in place of several existing stacks. While this practice can increase the buoyancy of the effluent gas stream, result-

ing in higher plume rise and greater dispersion, there are a number of economic reasons for such practices, which may be independent of their potential effects on emission limitations. These economic considerations include the costs of constructing and maintaining separate stacks, limits on the available land, and the cost savings of combining gas streams for the application of a single piece of pollution control equipment over the costs of installing control equipment on numerous separate stacks.

In response to these concerns, EPA has considered several additional alternatives for determining when the practice of merging gas streams should be excluded from the definition of prohibited dispersion techniques. These alternatives are:

1. The resulting stack height is less than the *de minimus* 65 meter height;

2. The maximum allowable emissions are less than 5000 tons per year (or some other size limit);

3. The source demonstrates that the merging of gas streams is for sound engineering or economic reasons; and

4. The source demonstrates, on a case-by-case basis, that such merging is associated with installation of pollution control devices, irrespective of the effect on emissions.

The Agency's rationale for considering Alternatives 1 and 2 is that the emissions from sources eligible for such exemptions are relatively small and the higher plume rise resulting from merged gas streams in these case would not have so great an effect on the sources' emission limitations as to contribute significantly to total pollutant burden.

Alternative 3 would acknowledge the many engineering and economic reasons for emerging gas streams and would allow credit for such merging where a source demonstrates to the satisfaction of EPA that the justification for merging gas streams is independent of any potential

effect on the source emission limitation. The Agency acknowledges that this approach is inherently subjective and involves some test of intent that might be difficult to administer.

Alternative 4 would presume that if a source is combining the merging of gas streams with the installation of pollution control equipment, that such merging is not being undertaken in order to avoid a more stringent emission limitation, but is being carried out for other reasons. This approach would require some limitation in its application to prevent sources from taking credit for the allow merging of gas streams if the change in operations would yield no significant benefit in controlling pollutant emissions.

EPA's present regulation excludes smoke management in agricultural and silvicultural prescribed burning programs. The Agency is proposing additional exclusions for episodic restrictions on residential woodburning and debris burning. Programs incorporating such restrictions are currently being carried out by a number of State and local agencies around the country as part of EPA-approved SIP's, and can be used to provide expeditious relief in some areas during periods of atmospheric stagnation. EPA does not believe that Congress intended regulation of these source categories under Section 123 of the Clean Air Act.

EPA requests comments on the alternatives described above, and on other cases for excluding the merging of exhaustion gas streams from the definition of prohibited dispersion techniques. EPA will consider in the future whether to include or exclude other practices from the definition of dispersion techniques.

New Sources Tied into Pre-1971 Stacks

Where, after December 31, 1970, a new source, or an existing source for which a major modification, as de-

fined in 40 CFR 51.18(j)(I)(v)(*a*), 51.24(b)(2)(i), and 52.21(b)(2)(i), is carried out, has tied into a grandfathered stack of greater than GEP height, EPA is proposing to allow credit only for so much stack height as conforms to GEP, as defined in Sections 51.1(ii) and (hh) of this proposal. Sources in existence on or before December 31, 1970, for which modifications after that date are not classified as "major," will be allowed to retain full credit for height of the grandfathered stack.

EPA's rationale for the above distinction is that sources in existence on or before December 31, 1970, and in need of minor modification, have limited flexibility, and such modifications would not significantly affect an existing emission limitation. New sources and sources contemplating reconstruction or major modification are better able to accommodate the effects of reducing stack height credit, either through the application of greater emission controls or through relocation to areas with less complex terrain.

State Implementation Plan Requirements

All States would be required to review and revise, as necesasry, their SIP's to comply with this new regulation on stack height credits and dispersion techniques. Extensive State and Federal effort will be necessary to review, in detail, all emission sources in accordance with the stack height requirements.

In accordance with Section 406(d)(2)(b) of the Act, revisions to SIP's that are required by the stack height regulation must be submitted within 9 months after promulgation of the regulation. Where existing emission limitations are affected by the stack height credit above GEP, the SIP revisions will be required to include any changes needed to bring the limitations into conformance.

Sources in rugged terrain may face serious implementation problems when using current complex terrain screening models to establish emission limitations. Although EPA is currently developing more refined complex terrain models, such models will not be available in time for implementing Section 123. Accordingly, EPA is soliciting comment on whether allowance should be made for implementation problems created by application of GEP stack height credit assumptions to complex terrain sources and, if so, how should allowance be made.

Interim Guidance

EPA intends to use the proposed regulation to govern stack height credits during the period before promulgation of the final regulation. Any stack height credits based on this interim guidance would be subject to review against the final rules and may need to be revised.

Impact Analysis

The air quality and economic impact of the stack height regulation is directly related to the degree that actual stack heights conform to GEP stack heights. Thus, in general when the regulation is applied to tall stack facilities, i.e., those with stack heights greater than GEP, it will have the potential for producing positive air quality impacts (emission reductions and negative economic impacts (increased control cost). Impacts on short stack facilities, if permitted to raise their stacks, are expected to be the reverse.

A preliminary evaluation of the potential air quality impacts and a cost analysis of the regulation was performed on a sample of the potentially affected sources. The impacts identified have been established in isolation of other regulatory requirements. For example, for sources affected by NSPS in 40 CFR Part 60, the degree of emission reduction required by such standards may greatly exceed the degree of emission reduction de-

termined to be needed for the source when it is modeled with a GEP stack height. In this example, the stack height regulation impacts are clearly hypothetical ones and would only have a quantifiable effect if the NSPS did not exist.

The report predicts a range of impacts, a "low impact" scenario that presumes that many potentially affected sources will be able to justify their existing stack heights, configurations, and emission limitations to a "high impact" scenario which assumes that all of the potentially affected sources will be required to reduce their emissions to some degree. In this regard, the report predicts that the proposed revisions to the regulation will impose annualized costs of between $300 million and $1.4 billion, with total capital costs of between $900 million and $4.6 billion. Reductions in sulfur dioxide emissions are projected within a range of 790,000 tons to 2.88 million tons. To a great extent, affected sources will be able to respond to these changes in the regulation through conversion to lower sulfur fuel. However, some source may have to install additional control equipment, i.e., scrubbers, and their is likely to be some increase in reliance on those sources with scrubbers already in place.

Regulatory Flexibility Analysis

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the attached rule will not have significant economic impacts on a substantial number of small entities. This rule is structured to apply only to large sources; i.e., those with stacks above 65 meters (213 feet). Based on an analysis of impacts, electric utility plants and possibly several smelters and pulp and paper mills will be significantly affected by this regulation.

Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject

to the requirement of a regulatory impact analysis. EPA's initial analysis of economic impacts predicts a potential cost to emission source owners and operators exceeding $100 million; therefore, this is a major rule under Executive Order 12291. However, due to the 6-month promulgation deadline imposed by the court, EPA did not have sufficient time to develop a full analysis of costs and benefits as required by the Executive Order. A preliminary economic impact analysis has been prepared and is in the docket. Consequently, it is not possible to judge the annual effect of this rule on the economy. This proposal was reviewed by the Office of Management and Budget.

Solicitation of Comments

The Agency actively solicits comments on all aspects of the proposed regulation.

List of Subjects in 40 CFR Part 51

Admainistrative practice and procedure, Air pollution control, Carbon monoxide, Hydrocarbons, Intergovernmental relations, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeing requirements, Sulfur oxides.

(Sec. 110, 301(a), and 123, Clean Air Act as amended, (42 U.S.C. 7410, 7601(a) and 7423))

Dated: November 7, 1984.

William D. Ruckelshaus,

Administrator.

PART 51—REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS

It is proposed to amend Part 51 of Chapter I, Title 40 of the Code of Federal Regulations as follows:

1. Section 51.1 is amended by revising paragraphs (hh), (ii), (jj), and (kk) as follows:

§ 51.1 Definitions.

* * * *

(hh) (1) "Dispersion technique" means any technique which attempts to affect the concentration of a pollutant in the ambient air by:

(i) Using that portion of a stack which exceeds good engineering practice stack height;

(ii) Varying the rate of emission of a pollutant according to atmospheric conditions or ambient concentrations of that pollutant; or

(iii) Increasing final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters, or combining exhaust gases from several existing stacks into one stack; or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise.

(2) The preceding sentence does not include:

(i) The reheating of a gas stream, following use of a pollution control system, for the purpose of returning the gas to the temperature at which it was originally discharged from the facility generating the gas stream:

(ii) The merging of exhaust gas streams where:

(A) The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams; or

(B) Such merging is associated with a change in operation at the facility that includes the installation of pollution control equipment which results in a net reduction in total emissions of the pollutant being controlled. This exclusion from the definition of "dispersion techniques" shall apply only to the emission limitation for the pollutant affected by such control equipment;

(iii) Smoke management in agricultural or silvicultural prescribed burning programs; or

(iv) Episodic restrictions on residential woodburning and debris burning.

(ii) "Good engineering practice (GEP) stack height" means the greater of:

(1) 65 meters;

(2) (i) For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable permits or approvals required under 40 CFR Parts 51 and 52.

$Hg = 2.5H,$

provided the owner or operator produces evidence that this equation was actually relied on in designing the stack to ensure protection against downwash;

(ii) For all other stacks.

$Hg = HH + 1.5L,$

where:

Hg = good engineering practice stack height, measured from the ground-level elevation at the base of the stack,

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension (height or projected width) of nearby structure(s),

provided that the EPA, State or local control agency may require the use of a field study or fluid model to determine GEP stack height for the source; or

(3) The height demonstrated by a fluid model or a field study approved by the EPA, State or local control agency, which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures or nearby terrain features.

(jj) "Nearby" as used in paragraph (ii) of this section is defined for a specific structure or terrain feature and for purposes of applying the formulae provided in paragraph (ii)(2) of this section means that distance up to five times the lesser of the height or the width dimension of a structure, but not greater than 0.8 km (½ mile), and for conducting demonstrations under paragraph (ii)(3) of this section means not greater than 0.8 km (½ mile). The height of the structure or terrain feature is measured from the ground-level elevation at the base of the stack.

Option 1

For purposes of demonstrations under paragraph (ii)(3) of this section, terrain features may be considered to be nearby if such features fall entirely within a distance of 0.8km (½ mile) from the stack. Portions of terrain features which extend beyond 0.8km may be considered up to a distance equal to 10 times the maximum height of the features not to exceed 2 miles, if such features achieve a height 0.8km from the stack that is greater than or equal to 40 percent of the GEP stack height determined by the formulae provided in paragraph (ii)(2)(ii) of this section, as measured from the ground-level elevation at the base of the stack.

Option 2

For stacks in existence prior to (date of promulgation), terrain features may be considered to be nearby for purposes of demonstrations under paragraph (ii)(3) of this section if such features fall entirely within a distance of 0.8 km (½ mile) from the stack. Portions of terrain features which extend beyond 0.8 km may be considered up to a distance equal to 10 times the maximum height of the features, not to exceed 2 miles, if such features achieve a height 0.8 km from the stack that is greater than or equal to 40 percent of the GEP stack height determined by the formulae provided in paragraph (ii)(2)(ii) of this section, as measured from the ground-level elevation at the base of the stack.

For stacks on which construction was commended after (date of promulgation), only those portions of terrain features which fall within a distance of not more than 0.8 km (½ mile) may be considered to be nearby for purposes of demonstrations pursuant to paragraph (ii)(3) of this section.

(kk) "Excessive concentration" for the purpose of determining good engineering practice stack height means a maximum ground level concentration due to emissions from a stack due in part or whole to downwash, wakes, or eddy effects produced by nearby stuctures or terrain features which individually is at least 40 percent in excess of the maximum concentrations experienced in the absence of such downwash, wakes, or eddy effects (and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard. For sources subject to the prevention of significant deterioration program (40 CFR 51.24 and 52.21) an excessive concentration is a maximum ground level concentration due to emissions from a stack due in part or whole to downwash, wakes, or eddy effects produced by nearby structures or terrain features which individually is at least 40 percent in excess of the maximum concentrations experienced in the absence of

such downwash, wakes, or eddy effects and that is greater than that permitted by an applicable prevention of significant deterioration increment.)[1]

§ 51.1 [Amended]

2. Sections 51.1 amended by removing paragraphs (ll) and (mm).

§ 51.12 [Amended]

3. Section 51.12 is amended by removing paragraph (l).

4. Section 51.12(j) is amended by removing "and (l)" from the first sentence.

5. Section 51.12(k) is revised as follows:

§ 51.12 Control strategy; General

* * * *

(k) The provisions of paragraph (j) of this section shall not apply to stacks in existence, or dispersion techniques implemented on or before December 31, 1970, except where pollutants are being emitted from such stacks or using such dispersion techniques by sources, as defined in section 111(a)(3) of the Clean Air Act, which were constructed, or for which major modifications, as defined in §§ 51.18(j)(1)(v)(*a*), 51.24(b)(2)(i) and 52.21(b)(2)(i), were carried out after December 31, 1970.

* * * *

§ 51.18 [Amended]

6. Section 51.18(l) is amended by removing "and (l)" from the first sentence.

[FR Doc. 29725 Filed 11-8-84 am]

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[1] The language in parentheses would be added if the second option under "Nearby" is adopted.

CLEAN AIR ACT
IMPLEMENTATION PLANS

Sec. 110. (a) (1) Each State shall, after reasonable notice and public hearings, adopt and submit to the Admininstrator, within nine months after the promulgation of a national primary ambient air quality standard (or any revision thereof) under section 109 for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. In addition, such State shall adopt and submit to the Administrator (either as a part of a plan submitted under the preceding sentence or separately) within nine months after the promugation of a national ambient air quality secondary standard (or revision thereof), a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region or portion thereof) within such State. Unless a separate public hearing is provided, each State shall consider its plan implementing such secondary standard at the hearing required by the first sentence of this paragraph.

(2) The Administrator shall, within four months after the date required for submission of a plan under paragraph (1), approve or disapprove such plan or any portion thereof. The Administrator shall approve such plan, or any portion thereof, if he determines that it was adopted after reasonable notice and hearing and that—

(A) except as may be provided in subparagraph (I), (i), in the case of a plan implementing a national primary ambient air quality standard, it provides for the attainment of such primary standard as expeditiously as practicable but (subject to subsection (e)) in no case later than three years from the date of approval of such plan (or any revision thereof to take account of a revised primary standard); and (ii) in the case of a plan implementing a national secondary ambient air quality stand-

ard, it specifies a resoniable time at which such secondary standard will be attained;

(B) it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard, including, but not limited to, transportation controls, air quality maintenance plans, and preconstruction review of direct sources of air pollution as provided in subparagraph (D);

[PL 95-95, August 7, 1977]

(C) it includes provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality and, (ii) upon request, make such data available to the Administrator;

(D) it includes a program to provide for the enforcement of emission limitations and regulation of the modification, construction, and operation of any stationary source, including a permit program as required in parts C and D and a permit or equivalent program for any major emitting facility, within such region as necessary to assure (i) that national ambient air quality standards are achieved and maintained, and (ii) a procedure, meeting the requirements of paragraph (4), for review (prior to construction or modification) of the location of new sources to which a standard of performance will apply;

[PL 95-95, August 7, 1977]

(E) it contains adequate provisions (i) prohibiting any stationary source within the State from emitting any air pollutant in amounts which will (I) prevent attainment or maintenance by any other State of any such national primary or secondary ambient air quality standard or (II) interfere with measures required to be in-

cluded in the applicable implementation plan for any other State under part C to prevent significant deterioration of air quality or to protect visibility, and (ii) insuring compliance with the requirements of section 126, relating to interstate pollution abatement;

[PL 95-95, August 7, 1977]

(F) it provides (i) necessary assurances that the State will be adequate personnel, funding, and authority to carry out such implementation plan, (ii) requirements for installation of equipment by owners or operators of stationary sources to monitor emissions from such sources, (iii) for periodic reports on the nature and amounts of such emissions; (iv) that such reports shall be correlated by the State agency with any emission limitations or standards established pursuant to this act, which reports shall be available at reasonable times for public inspection; (v) for authority comparable to that in section 303, and adequate contingency plans to implement such authority; and (vi) requirements that the State comply with the requirements respecting State boards under Section 128;

[PL 95-95, August 7, 1977]

(G) it provides, to the extent necessary and practicable, for periodic inspection and testing of motor vehicles to enforce compliance with applicable emission standards;

(H) it provides for revision, after public hearings, of such plan (i) from time to time as may be necessary to take into account of revisions of such national primary or secondary ambient air quality standard on the availability of improved or more expeditious methods of achieving such primary or secondary standard; or (ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements or to otherwise comply with

any additional requirements established under the Clean Air Act Amendments of 1977; and

[PL 95-95, August 7, 1977]

(I) it provides that after June 30, 1979, no major stationary source shall be constructed or modified in any nonattainment area (as defined in section 171(2) to which such plan applies, if the emissions from such facility will cause or contribute to concentrations of any pollutant for which a national ambient air quality standard is exceeded in such area, unless, as of the time of application for a permit for such construction or modification, such plan meets the requirements of part D (relating to nonattainment areas);

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(J) it meets the requirements of section 121 (relating to consultation), section 127 (relating to public notification), part C (relating to prevention of significant deterioration of air quality and visibility protection); and

[PL 95-95, August 7, 1977]

(K) it requires the owner or operator or each major stationary source to pay the permitting authority as a condition of any permit required under this Act a fee sufficient to cover—

(i) the reasonable costs of reviewing and acting upon any application for such a permit, and

(ii) if the owner or operator receives a permit for such source, whether before or after the date of enactment of this subparagraph, the reasonable costs (incurred after such date of enactment) of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action).

[PL 95-95, August 7, 1977]

STACK HEIGHTS

Sec. 123. (a) The degree of emission limitation required for control of any air pollutant under an applicable implementation plan under this title shall not be affected in any manner by—

(1) so much of the stack height of any source as exceeds good engineering practice (as determined under regulations promulgated by the Administrator), or

(2) any other dispersion technique.

The preceding sentence shall not apply with respect to stack heights in existence before the date of enactment of the Clean Air Amendments of 1970 or dispersion techniques implemented before such date. In establishing an emission limitation for coal-fired steam electric generating units which are subject to the provisions of section 118 and which commenced operation before July 1, 1957, the effect of the entire stack height of stacks for which a construction contract was awarded before February 8, 1974, may be taken into account.

(b) For the purpose of this section, the term 'dispersion technique' includes any intermittent or supplemental control of air pollutants varying with atmospheric conditions.

(c) No later than six months after the date of enactment of this section, the Administrator, shall after notice and opportunity for public hearing, promulgate regulations to carry out this section. For purposes of this section, good engineering practice means, with respect to stack heights, the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies and wakes which may be created by the source itself, nearby structures or nearby terrain obstacles (as determined by the Administrator). For purposes of this sec-

tion such height shall not exceed two and a half times the height of such source unless the owner or operator of the source demonstrates, after notice and opportunity for public hearing, to the satisfaction of the Administrator, that a greater height is necessary as provided under the preceding sentence. In no event may the Administrator prohibit any increase in any stack height or restrict in any manner the stack height of any source.

[PL 95-95, August 7, 1977]

§ 553. Rule making

(a) This section applies, according to the provisions thereof, except to the extent that there is involved—

(1) a military or foreign affairs function of the United States; or

(2) a matter relating to agency management or personnel or to public property, loans, grants, benefits, or contracts.

(b) General notice of proposed rule making shall be published in the Federal Register, unless persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law. The notice shall include—

(1) a statement of the time, place, and nature of public rule making proceedings;

(2) reference to the legal authority under which the rule is proposed; and

(3) either the terms or substance of the proposed rule or a description of the subjects and issues involved.

Except when notice or hearing is required by statute, this subsection does not apply—

(A) to interpretative rules, general statements of policy, or rules of agency organization, procedure, or practice; or

(B) when the agency for good cause finds (and incorporates the finding and a brief statement of reasons therefor in the rules issued) that notice and public procedure thereon are impracticable, unnecessary, or contrary to the public interest.

(c) After notice required by this section, the agency shall give interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments with or without opportunity

for oral presentation. After consideration of the relevant matter presented, the agency shall incorporate in the rules adopted a concise general statement of their basis and purpose. When rules are required by statute to be made on the record after opportunity for an agency hearing, sections 556 and 557 of this title apply instead of this subsection.

(d) The required publication or service of a substantive rule shall be made not less than 30 days before its effective date, except—

(1) a substantive rule which grants or recognizes an exemption or relieves a restriction;

(2) interpretative rules and statements of policy; or

(3) as otherwise provided by the agency for good cause found and published with the rule.

(e) Each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule.

§ 706. Scope of review

To the extent necessary to decision and when presented, the reviewing court shall decide all relevant questions of law, interpret constitutional and statutory provisions, and determine the meaning or applicability of the terms of an agency action. The reviewing court shall—

(1) compel agency action unlawfully withheld or unreasonably delayed; and

(2) hold unlawful and set aside agency action, findings, and conclusions found to be—

(A) arbitrary, capricious, an abuse or discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right;

(D) without observance of procedure required by law;

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute; or

F) unwarranted by the facts to the extent that the fact are subject to trial de novo by the reviewing court.

In making the foregoing determinations, the court shall review the whole record or those parts of it cited by a party, and due account shall be taken of the rule of prejudicial error.